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# MOTOR AGE

Volume XXXV  
Number 7

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, FEBRUARY 13, 1919

Fifteen Cents a Copy  
Three Dollars a Year

## Do You Want a Share of \$12,000,000?

That is the aggregate prize offered Hudson dealers for 1919.  
Pretty fair, though people are now accustomed to talking in billions.

But just as it required faith and hard work to raise the billions, the reward of \$12,000,000 that is offered Hudson dealers must also go with faith and punch.

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Review the past three years and make mental note of how Hudson dealers have prospered. Wherever you live, there is a notable example of Hudson success near you. Hudson dealers have grown from doing a little one-man automobile business into being prominent merchants. Their buildings are the show places of the business in practically every important city in America.

They are successful men. Much of the credit is due to their individual efforts. Wherever there was a man who did not measure up to Hudson standard he was soon changed. But those who have stayed and prospered are frank to admit that without the Super-Six they could not have done so well. The Super-Six was the easy selling car. It made a reputation and it held it. The limit to the dealers' success was the limit of deliveries. That condition will be improved this year, for we will build more cars than ever before.

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If you would like to go along with us, write. There may be a fine opportunity awaiting you, if you only let us know you are interested.



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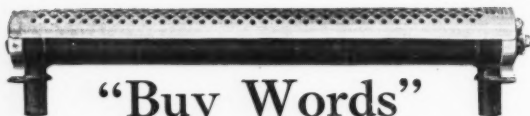
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Detroit, Michigan

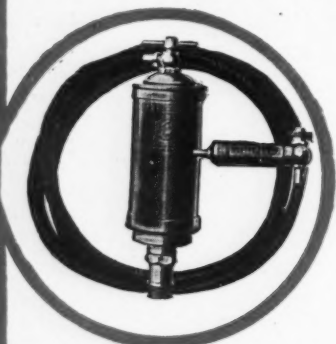


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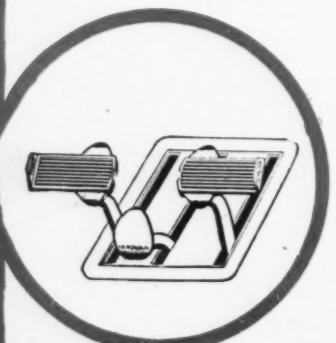
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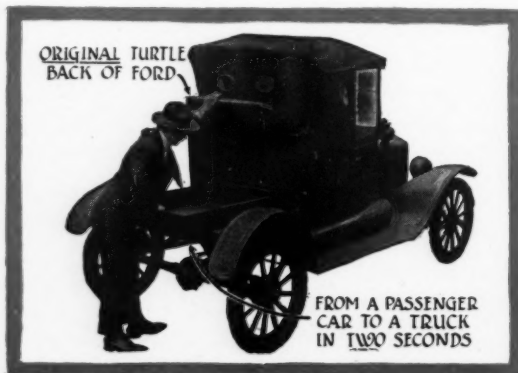
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# MOTOR AGE

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The New Tractors and What They Indicate

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## MOTOR AGE

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Write for new catalog "Keeping Down the Upkeep"

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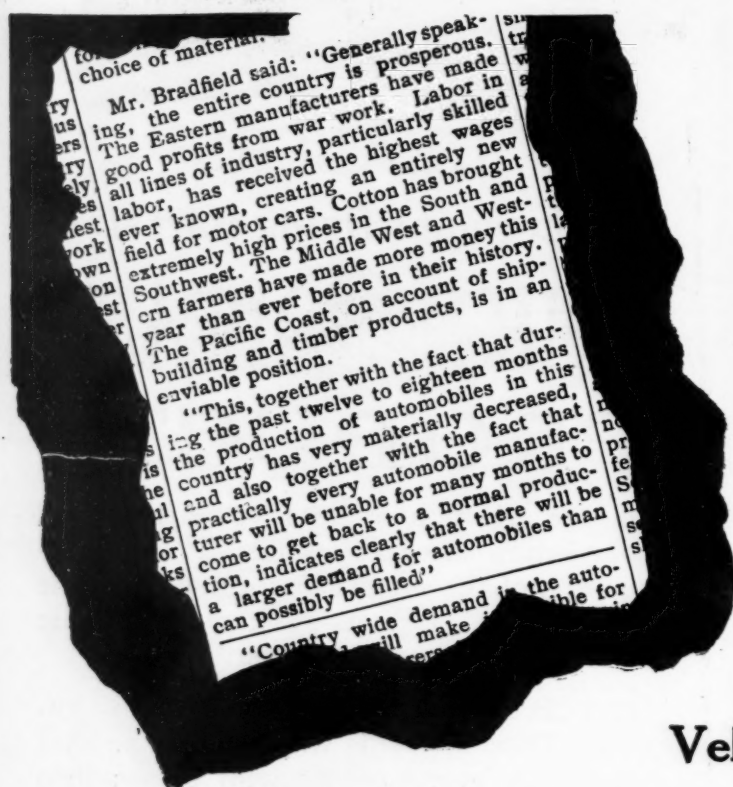
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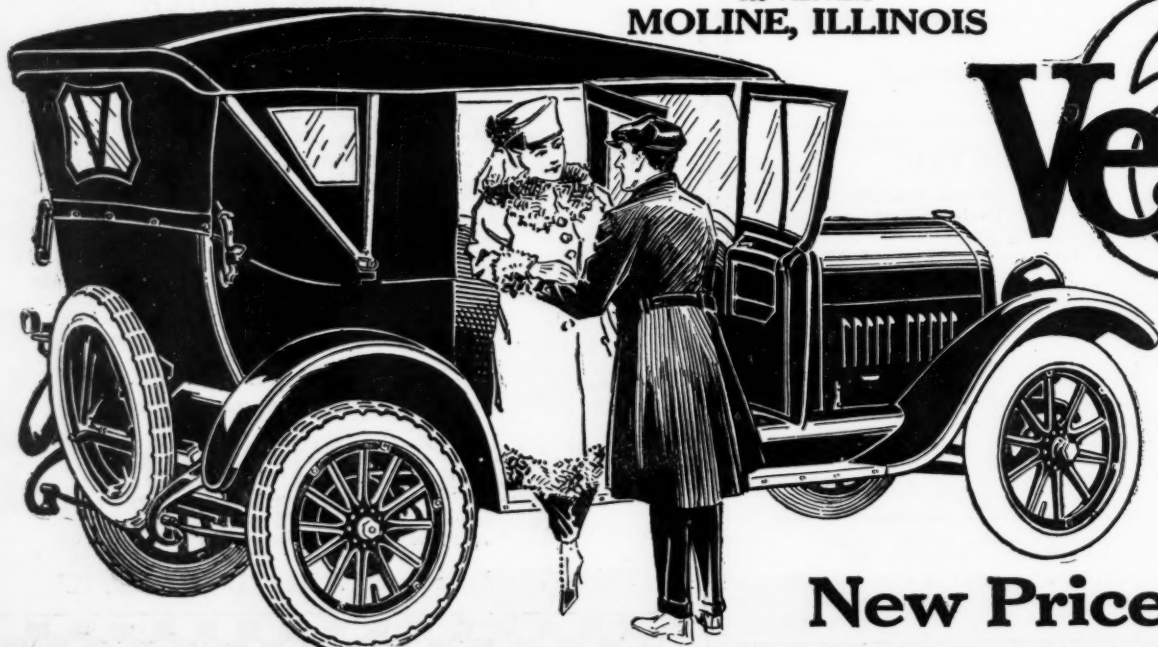
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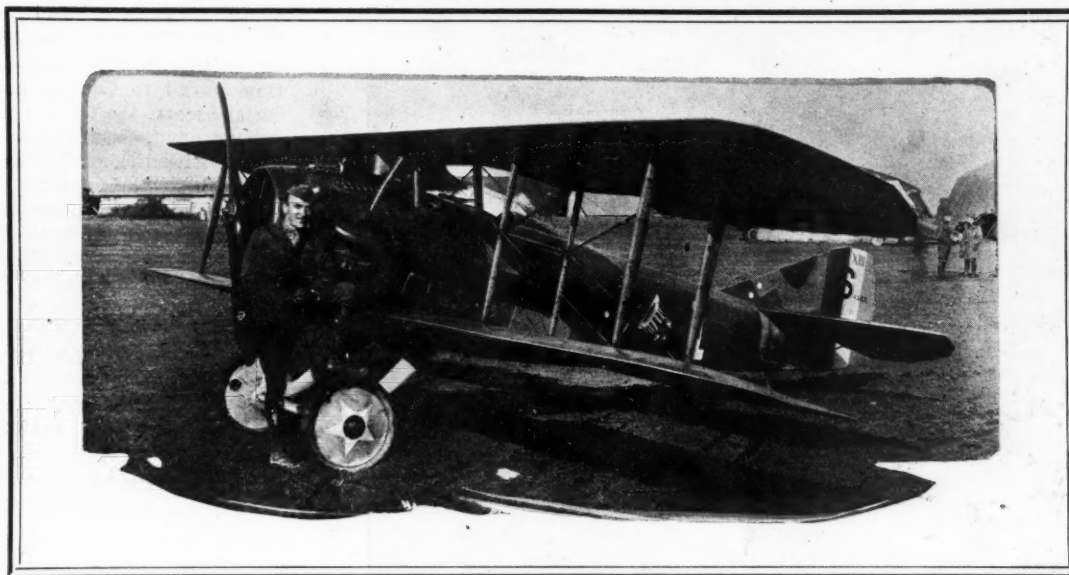


# Velie

New Price \$1465



# MOTOR AGE



The white spots are a few German bullet holes. Rickenbacker never had new wings and never crashed a rudder or elevators, etc. He never crashed a machine and only once left the airdome and did not return to it

## America's Ace of Aces

### Rickenbacker's Record of Twenty-Six Planes and How He Made It

By David Beecroft

WITH less than seven months combat flying at the front, Capt. Eddie Rickenbacker, America's ace of aces, put himself in the premier position of war flyers by bringing down twenty-six Hun machines, more victims than any other pilot in our flying corps has to his credit.

It was on April 14, 1918, that the 94th Squadron, to which Captain Rickenbacker was attached, received orders to move to the Toul sector just back of the St. Mihiel salient and with that order Rickenbacker's spectacular climb up the ladder of aviation fame began. Previous to that date he had done practice flying in the Champagne area near Chalons, but he had never been sent over the lines. His work in the Champagne was three weeks of preparation for the real start. How well those short weeks were used is better written in the short record of the following seven months during which he reached the pinnacle of aviation fame in our army and counted as his victims such well-known Hun machines as

Fokker, Albatross, Pfalz, Rumpler, Hanover, C. V. G. and other less conspicuous makes. In those seven short months he measured himself with the best Hun pilots and brought down two of the famous Richtofen's flying circus, which was the terror of the western front during 1917 and 1918. He registered his first double victory in one day by shooting down two Boches on Sept. 25, a feat that he duplicated several times before the curtain was rung down on armistice day, Nov. 11.

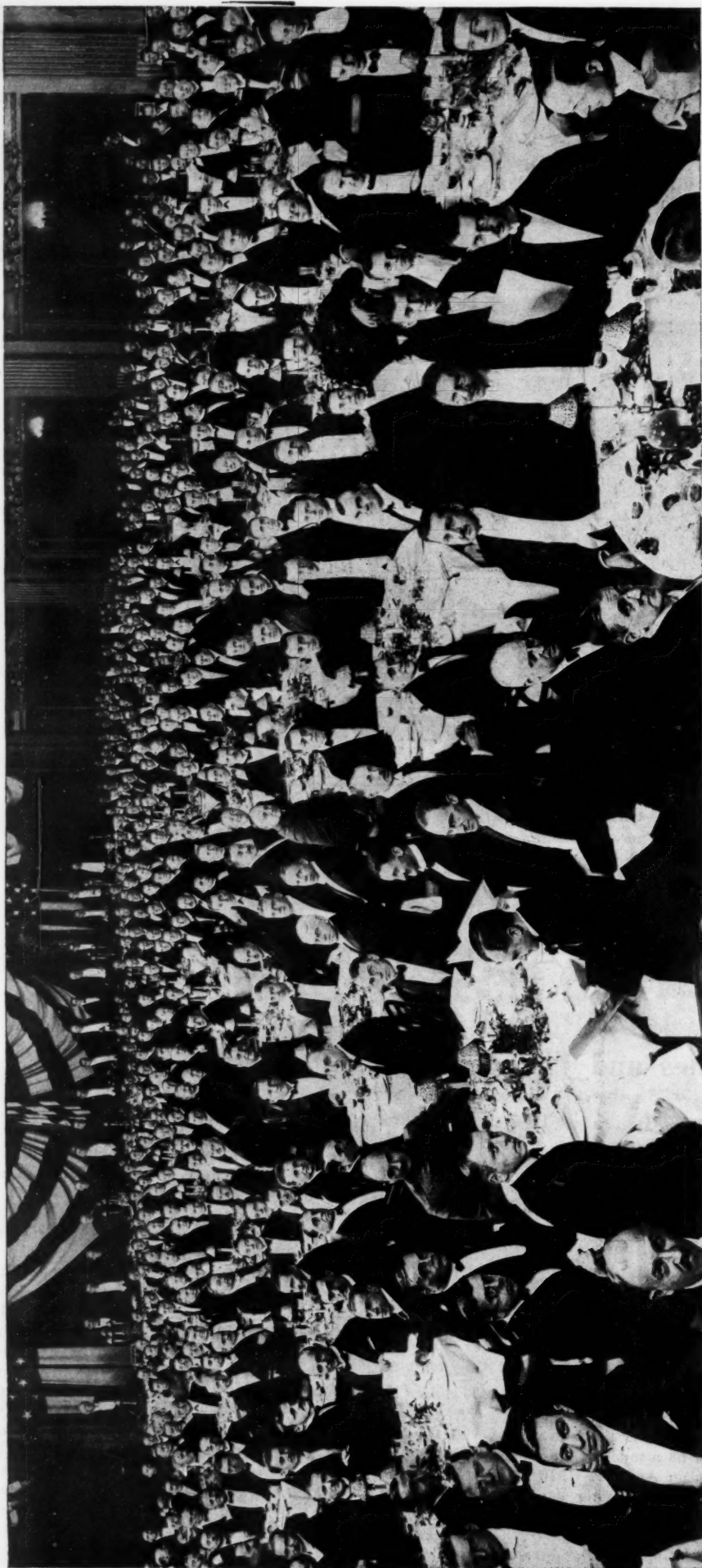
#### A Captain Oct. 1

Rickenbacker started his aerial combat career as a modest lieutenant in the Signal Corps on April 14, 1918, but fate had him destined for higher honors. He was only two weeks in the combat zone with his fast Nieuport scout machine when he claimed his first Boche. The date was April 29.

After the success Rick rested almost con-

sistently on his planes. By Oct. 1 he had nine Boches to his credit and was Captain Rickenbacker. His work attracted such attention that he was given command of the 94th Squadron, although there were senior officers in the squadron. At that time the squadron stood third in the number of Boche machines and it was perhaps this handicap that spurred Rickenbacker to the almost super-human task of leadership that he set his heart upon. He solemnly swore to himself that the 94th should be first if aught he could do might make it so, and first it was. When Foch had the terms signed on Nov. 11, the 94th was leading all other American squadrons and had fifty-nine Boches to its credit, twenty-six of which were Rickenbacker's victims. As a squadron leader he had reached his ideal. He had won premiership. He outdistanced even the famous Lafayette squadron, which in more than three years of service had a total of but forty Boches.

To the 94th fell still another credit. It



The dinner given in honor of Rickenbacker by the A. A. A. Contest Board and attended by many notables of the military and racing worlds

was the first American squadron with our army to bring down a Boche, and its squadron records contain the credit for the last Boche victim, which was brought down late in the afternoon of Nov. 10, scarcely more than 10 hr. before the armistice terms were signed at 5 o'clock the following morning.

The leadership of the old 94th squadron was largely due to Rick's leadership. When appointed squadron commander his first thought was building up the esprit de corps of the unit. All the pilots listened to his words of encouragement. The 94th was third. It must be first. Rick felt it. He believed it. The other pilots caught his spirit and from the day he took command the leadership was assured. So well was the job done, when the army of occupation moved to Coblenz and asked for an aerial escort, the 94th, with Rickenbacker in command, was given the honor and moved with the army into Germany. Old members of the squadron who had taken command of other squadrons, joined the 94th, to be a factor in the final acts of the tragedy if necessary. Rickenbacker's success as a squadron leader was entirely due to his team play. He was always one of the boys, and when it came to an O. P.—offensive patrol—over the lines he was there, leading his squadron. When it came to certifying the crashes of Boche victims after a patrol, Rickenbacker was off on the job.

#### A Squadron Commander

As a squadron commander and slayer of Boches Rickenbacker was insatiable. He was never contented. He was never satisfied. If squadron orders were for an early morning O. P., which lasted for a couple of hours, he would go off alone in the afternoons, cruising above cloudland for Boche fighting scouts or looking for Boche photographing patriots that wanted to spy on the preparation work of the Americans. If the squadron patrol was in the afternoon or late evening, then he spent his morning on solo hunts. It was while on these trips that he caught half of his victims, the other half being brought down while leading his squadron.

As a fighting scout Rickenbacker was a disciple of that class of pilots who reckon primarily on speed in attack. Their motto is quick attack and leave it. Those pilots have convinced themselves that the only sure and safe attack is the speedy and surprise one. They generally have arrived at this conclusion from a mathematical study of aerial fighting. The fighting pilot who takes 10 min. or more in getting his Boche very frequently never returns to the squadron to tell his story. In those 10 or more fatal minutes other Boche machines cruising in the higher air, perhaps 20,000 ft. or higher, have seen the duel and before the Allied pilot is aware of it two or three of them have dived down at 200 m.p.h. on him and the first knowledge of their approach is the crack, crack of their machine guns. The great aces all know this. Rickenbacker very early realized that if he indulged in running fights that lasted for several minutes it was only a question of time until he would make his last trip out to meet the enemy.

In aerial fighting position is one of the dominant factors. The plane highest up



always has the advantage. It can conceal itself high above clouds and cruise around looking for Boche thousands of feet below. Once the enemy speck is seen the Allied pilot aims to keep himself hidden as long as possible and then begins maneuvering for position. He wants to be between the sun and the Hun. That particular portion of the sky is the blind zone to the fighting scout. When a machine is between you and the sun you cannot see it. That plane occupies the greatest advantage it is possible to possess. To the advantage of the sun position add the advantage of a few thousand feet altitude and you have the combination that the shrewd fighting scout is always looking for. When he gets this combination he is ready for the attack—that second when the enemy unaware of his presence is almost his certain victim.

#### Tactics of Air Fighting

It is that moment when the scout pointing the nose of his machine earthward turns on his engine to the full and goes down, sometimes straight as a plummet, for thousands of feet until he is near his victim. Then he suddenly flattens out and opens fire with his machine gun before the Hun is aware of it. It has all occupied but a minute or so. Then follows a short, quick duel. If the first burst of machine gun bullets has not reached the mark the Hun goes into his favorite aerial acrobatics, and a running fight begins. The Hun invariably goes earthward in an amazing series of stunts and soon both machines are within range of the enemy Archies, anti-aircraft guns, and then other enemy machines are joining in the melee. Rickenbacker early familiarized himself with the mathematical impossibility of following such fighting tactics and living to report the story that evening at squadron headquarters. His chief deduction was that it was better for America that he live to fight than that he crash in Hunland.

This deduction was his guiding principle. Never once did he stray from it. It was a quick job—a crushed Hun or leave him and sail away, climbing in great spirals higher and higher to get the necessary position for another attack or, if gasoline were running low, head straight over the lines homeward for the squadron, for if there is one nightmare with the fighting scout it is the fear of getting into a dog fight with a dozen Hun planes 10 or 20 miles back over Hun territory and courting the possibility of being forced lower and lower by sheer force of numbers and then having to dart for home at a low level, where all the Hun Archies can play on him.

#### Pilot and Engine

Rickenbacker is one of those fighting pilots who differ from the accepted theory that a pilot should understand his engine, the prevalent theory being that the best pilots are youths of eighteen to twenty-two who know no fear, who are not familiar with engines but who are a part of their machines. Rickenbacker is neither a youth or eighteen nor a novice with engines. He figures that his twenty-nine years stood him in good stead. They furnished that cool judgment that says when to start a scrap and when to leave it off. His engine experience is best attested to by his plane

record. His first five victories were on a Nieuport and the next twenty-one on the same Spad, out of which engine he had 120 hr. of satisfactory service. It had a 220-hp. Hispano-Suiza engine, and while he got 120 hr. of severe service out of it, the average life of similar engines in other planes was 9 hr. Many a scout pilot has lost his life by not knowing every throb of the engine. In a fighting plane the engine is the alpha and omega of the plane. With it in condition the pilot accomplishes the miraculous. Without it the best pilot "goes West."

Although the ace of American aces and with his left breast generously decorated with coveted ribbons-of-war decorations, Rickenbacker is the same Eddie he was when on July 4, 1914, he won his first great victory as an American racing driver by taking the 300-mile race that day on the Sioux City speedway. His victories have not changed his heart. He carries his decoration with that same boyish simplicity that he took his racing victories in 1914 and 1915. With Rick bath is still pronounced in the same schoolday accent while others have developed "bawth" and other would-be society speechisms that generally accompany such.

He is the old Rick of racing days, and yet he is a new Rick. He is a different Rick from the one who on a day in May, 1917, while working in Cincinnati for a speedway race, received a long-distance call from Washington, D. C., advising him that he could get a job as motor driver in the army and go to France, leaving the next day. On that eventful day Rick asked for an hour to think it over, but his friend in Washington said no. He must leave Cincinnati by noon and be in New York the next forenoon so as to take the boat that afternoon for England. Well, even then Rick did not need an hour to decide. It took but a few seconds. Again it was mathematics. "Can I see my mother in Columbus? If so, I will go." There was one hour with his mother in Columbus, then the New York train. The next morning he was sworn in as a sergeant and in the afternoon sailed for England. That was the good, old honest Rick we all knew in racing days. We were all proud of him in those days, but we are prouder of him to-day. We honor him now.

The new Rick is typical of the new prod-

uct that is being born of war on the shell-destroyed fields of France. He is the Rick who has faced death day after day. The man who has paid the price of honor was on the field or in the air, for a price is always paid. The soldier or air pilot who boasts of never knowing fear in battle does not live. If he says so, he lies. Every group of soldiers telling of battles invariably speak of when they had their "wind up." That expression means getting frightened. When the phrase "getting the wind up" is not used the same meaning is conveyed by the word "wind" or the alternative "windy." Rick has had his windy periods many a time, and best of all he never tries to hide the fact. It is the same with others who have grappled daily with death and survive to narrate the incidents. Rick talks freely of those days at the Toul airdrome when each time he took off with his squadron he never knew if he would return or not. Those were trying days. They were testing days. They were days when the human being literally lives through the fiery furnace.

When Rick got his wind up he had one remedy that always worked. After returning to the squadron headquarters he got in a motor car and drove over to one part of our front where he had some friends in the front line trenches. Leaving his car well back he made his way into the trenches and spent a night there. That was sufficient. If those dough boys could live in those trenches, with all the hell that went with it, as well as mud and all discomforts to which life in a fighting squadron was heaven, then the fighting scout with his Spad should never complain. Thus reinforced, he returned to squadron headquarters ready to carry on.

#### When Life Unrolls

Rick tells many interesting tales of those moments when nobody knows how the duel is going to end. Sometimes the plane gives way, and in the quick dive earthward you do not know if the wings will hold up while you flatten out to make for your squadron. In those anxious moments seconds are as hours and minutes as days. Your past life unrolls with superhuman speed. Dreams are outdistanced. Deeds for years forgotten rush by in kaleidoscopic flow. It is little wonder that Rick is a new Rick, and that our soldiers who have passed through



Here is the German Hanover that was Rick's fourteenth plane



This is the first Spad the U. S. A. army used. With it eighteen planes were brought down. A 220-hp. Hispano-Suiza geared down was used

the heat of battle are new men, souls that will bring home the new manhood born of the war.

Aviation had its subconscious period with Rickenbacker. As far back as 1914 he dreamed of aviation and had his first inclinations to get into the war. To-day the problem with him is how he managed to keep out of it so long. There was in him a subconscious struggle, a struggle that did not win out until that eventful forenoon in May, 1917, when the long-distance call reached him from Washington. From the second he decided to go there was no indecision as to where he would land eventually. It might be as a motor driver at first, but that would not be for long. It is not surprising that on his reaching England on June 9 and finding himself in Paris four days later, assigned as driver for General Pershing, that after two weeks of this he asked for transfer to the aviation section and on July 1, 1917, joined it in Paris. At that time there was no American training school ready, and so he continued driving a car until Aug. 25, when he went to Tours for a preliminary flying course. The course was taken in a French Caudron J3 machine. Sept. 1 his first flight with a pilot was made, and sixteen days later the final tests as a qualified aviator were taken. Sept. 17 was a gala day for him.

#### Chief Engineering Officer

Four days later his active life as an aviator began, not as a scout but as a worker to do a few of those myriad jobs that had to be done in France before our aviators could take their place in fighting squadrons on the front. Beginning Sept. 21, he started his job as chief engineering officer at the training school for our pilots at Issoudun. In Paris he purchased much of the necessary machinery for the job, but his main job was keeping the training planes in flying condition. This school, which finally opened Oct. 9, 1917, was an advanced training school in which were only Nieuport machines used by U. S. A. pilots. While in charge of these planes he did 30 min. flying each day until Dec. 20, when he went to a hospital in Paris with ear trouble. The drums in his ears were affected but by Jan. 8, 1918, he was out, and just as 1915 was destined to be Rick's great year in motor racing, so 1918 was his year as an aviator. His active work started with the opening days in January, and on the 8th his first war order reached

him. By it he was ordered to proceed at once to the aerial gunnery school at Cazeaux to take the three weeks' course in machine guns. This was followed by his last leave in Paris and March 20 brought him orders to report to the 94th squadron, which then was doing duty in Champagne. The squadron was located near Chalons, and it was here that he got his final lessons in practice flying and combat stunts until April 14, when the order to Toul arrived, and he reported there with his squadron and the seven active months of his aerial career began.

As a racing driver Rickenbacker's successful driving covered a brief period of not more than eighteen months, during which time he was a consistent winner on many speedways. His victories began July 4, 1914, when he won the 300-mile event on the Sioux City speedway in a Duesenberg. His second big victory came a year later on the same track on the same date in a Maxwell. Two days later he took the 300-mile feature at the Omaha speedway, and later in the fall he captured the principal event on the Providence track.

Rickenbacker was generally a hard-luck driver, particularly in the Indianapolis 500-races. He was a hard driver, and too frequently his engines broke under the punishment he gave them. His first 500-mile race was in 1911, when he drove Red Wing, a racing creation of Lee Frayer of Columbus, Ohio, Rick's home town. He was relief driver, and Red Wing got eleventh place in the finish.

His success with Red Wing was a little better in 1912, when he completed 150 miles before the center crankshaft bearing burned out, at which time he was running in fourth place and next to Joe Dawson, who won that year.

In 1914 he had better luck and finished ninth in the 500-mile Indianapolis grind in a Duesenberg. The 1915 Indianapolis race found him driving a Maxwell which carried him for 250 miles until it went out with a burned-out crankshaft bearing. He was in fourth place when it happened.

No better fortune followed him at Indianapolis in 1916, for after running a short time he went out with a burned-out connecting rod bearing.

Rickenbacker's racing career always will be associated with Fred Duesenberg, whose cars he drove when gaining his racing experience. For him it was a severe school of training, because the cars generally

were underpowered compared with those they competed with. It was a training in which defeat played a dominating role. It was an ideal school in which to develop the grade of nerve needed as a squadron leader in fighting Huns.

It was in the spring of 1913 that Rickenbacker went with Duesenberg, and this spot marked his real entry into motor racing. Previous to this time he had been connected with the sales end of the Columbus Buggy Co., having a traveling position with it for some years and later occupying the managership of its Omaha branch.

During 1913 he drove in all the races, invariably outdriving his mount and going out of the race when leading. In those days it was notorious of Rick that he outdrove his machine and never had an engine that could endure his pace. In that year he went out in the Elgin road race while leading. He invariably drove his cars to destruction.

His separation from Duesenberg came just after his 300-mile victory at Sioux City in 1914, when he went with the Peugeot organization. This connection was a short one, and his final racing connection was with the Maxwell racing organization in 1915. He won most of his successes in the Maxwell. When the Maxwell racing equipment was sold to the Indianapolis speedway in the fall of 1914, Rick went with the Indianapolis speedway to handle the cars. He spent the winter of 1915-16 rebuilding the cars for the 1916 season. His 1916 season was but mediumly successful. He started poorly at Indianapolis but later won the 200-mile event on the Sheepshead Bay track and later won at Des Moines and campaigned at Minneapolis, Omaha and Kansas City but had poor success. Success came to him in the 300-mile Tacoma race and he drove perhaps his greatest race in the Harkness Trophy race, when he finished second to the late John Aitken, who won the event.

#### Sailed in 1916

December, 1916, really saw Rickenbacker's entry into the war. In that month he sailed for England to secure racing cars for the 1917 season. Two months were spent in the Sunbeam experimental shops.

The summons to war was gaining on his consciousness, and he returned in February, 1917, and started on a campaign for the season. Our declaration of war April 6 dislocated America's racing program by Indianapolis' canceling all races during the period of the war. Rickenbacker, still a victim of the call to the air, eventually found himself in Cincinnati getting ready for a race there when the eventful Washington telephone call brought him face to face with his final great decision.

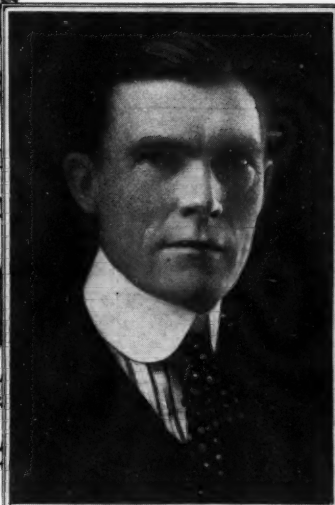
To discover just when Rickenbacker became inoculated with the racing bug germ takes us back to July, 1910, to a dirt track meet in Omaha. Rick had been traveling Texas for the Columbus buggy concern and he was elected to drive one of the cars in this dealers' meet. He won eight out of the nine events, remaining out of the ninth, in short, winning every event he started in. That day racing got Rick, and perhaps America's ace of races owes success in the Toul sector of France to those eight victories at Omaha.



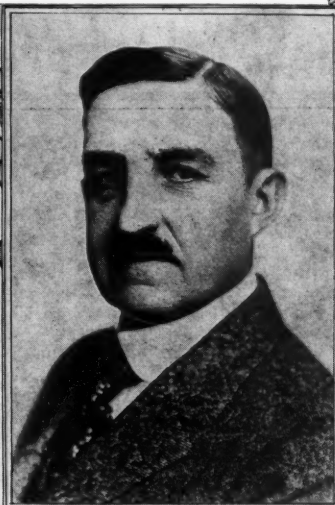
## Who's Who in the N. A. D. A. for 1919



Thomas J. Hay, Chicago, treasurer of dealers



E. W. Steinhart, Indianapolis, Ind., first vice-president



F. W. A. Vesper, St. Louis, president, re-elected



Harry G. Mooch, St. Louis, Mo., business manager

### HOW TO REACH N. A. D. A.

St. Louis, Mo., Feb. 10—The address of the National Automobile Dealers' Association now is 3124 Locust street. Business Manager Harry G. Mooch leased a suite of four offices on motor row and moved to his new location Friday. From the main office windows you can see nothing but automotive establishments and on the first floor is a truck agency.

The removal from the old location, in the Vesper-Buick Auto Co. offices, was a part of the policy approved at Chicago. The association concluded that it had accepted a donation of rent long enough from President F. W. A. Vesper. Besides, most dealers probably knew, President Vesper will need his entire building for his motor business this spring.

President Vesper's address, of course, will continue to be Lindell boulevard and Grand avenue, his business address.

Manager Mooch has spent the time since he returned from the annual meeting getting the records and expressions in shape for publication or filing and now is ready to begin work on the new program. One big job is a retabulation of all members as to expiration of their dues contracts. It will be necessary to increase the office force at least temporarily to get the records in shape for effective work under the plans that have been adopted.

### ACCESSORIES AT ST. LOUIS

St. Louis, Mo., Feb. 10—The St. Louis motor car show, Feb. 17-22, will feature the accessory department as the automotive equipment exhibit. The first list of exhibitors announced contained fifty names. Twelve truck companies have asked for desk space in the commercial car section. Only photographs and parts will be exhibited.

### UNAUTHORIZED REPRESENTATIVE

St. Louis, Mo., Feb. 10—A dealer at Wellington, Ohio, wrote to the N. A. D. A. headquarters last week to know why his

"touring maps" had not arrived. He said that Oct. 8, 1918, he paid \$12 to Chester W. Valvez for an annual membership in the "National Automobile Association" and he was to receive some maps.

The N. A. D. A. has no previous record of Valvez, and Manager Harry G. Mooch is anxious to hear from any other dealers who may have met or paid anything to this man. He was not in any way authorized to do business with the N. A. D. A. The Wellington firm has been asked to send a description of the man and as much information as possible concerning his plan.

### TO CONTINUE SUNDAY CLOSING

St. Louis, Mo., Feb. 10—The Garage Owners' Association has voted without dissent to continue night, Sunday and holiday closing. This action was taken after a special investigation was made. The association has appointed an efficiency committee to report on new appliances offered for motor vehicles. Membership in the association has been opened to dealers in tires, accessories and supplies.

### GARAGE OWNERS ELECT

St. Louis, Mo., Feb. 10—The St. Louis Auto Repair and Garage Owners' Association members were the guests of Capt. John Berry for dinner at the last meeting. Sixty-five were present. The following officers were elected: President, Otto Giessow; first vice-president, Charles Dorn; second vice-president, Henry Schultz; treasurer, J. C. Percival, and secretary, E. E. Robards.

### ELECTRIC WHEEL TRACTOR

Quincy, Ill., Feb. 7—The Electric Wheel Co., which has been engaged in the manufacture of steel wheels, farm wagons, farm trucks and logging trucks for twenty-five years, has added a 14-28 kerosene tractor. The company is now able to produce five of these tractors daily, and has enlarged its factory space to take care of the increased production.

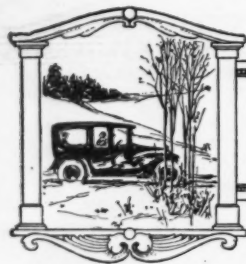
### M. A. D. PLANS TOUR

Milwaukee, Wis., Feb. 10—Encouraged by the unusual success of the twelfth annual Milwaukee show, held in the Auditorium, Jan. 24 to 30, the Milwaukee Automobile Dealers' Association is talking of holding a sociability and trade promotion tour during the latter part of June, to cover about 800 miles of the choicest and heaviest populated territory of Wisconsin. In former years, before the war, the association conducted a tour of this kind in July or August, having as its purpose the promotion of the annual fall show held in connection with the Wisconsin State Fair in Milwaukee.

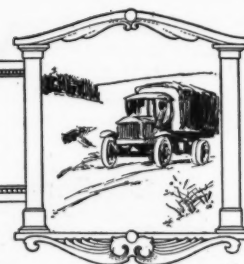
This year it is planned to hold the tour earlier, to put additional pep into both the dealer organization and the retail trade sources. In Wisconsin the touring season does not get fully under way until early in June, and this month is regarded as furnishing a most opportune time to develop business. Arrangements are still in a tentative stage but will be completed shortly after the annual meeting of the Milwaukee dealers' association later in February.

### DENVER DEALERS MEET

Denver, Col., Feb. 7—The National Western Stock Show here was made good use of by motor car and tractor distributors in this territory. Hundreds, or perhaps even thousands, of the stock show visitors were considered prospective buyers of cars or tractors. Besides the general alertness to gain acquaintance among these likely customers, three large distributors took advantage of the week as a favorable time for conventions of their dealers. These were the MacFarland Auto Co., Buick distributor for Colorado and Wyoming; the Cadillac Motor Co., Cadillac distributor for Colorado, Wyoming and western Nebraska, and the Mountain States Tractor Co., Fordson distributor for the northern half of Colorado. The attendance ranged from twenty to thirty-five dealers, the meetings were well attended and banquets were held.



# EDITORIAL



## Our Fighting Pilots

WHAT is to be the future of our thousands of aviators, many of whom have seen much service in France? This query has provoked endless discussion but not a single solution. The majority of the boys are going out of khaki. Many are going back to finish college courses, and others are returning to business and industry. Very few express the thought that they want to remain in the air force or become aerial taxi drivers, aerial chauffeurs or aerial pilots for planes carrying mail, express or light merchandise.

THOUSANDS of the boys have done their job, are glad the show is over and are glad to get back into civilian life. They have no desire for aviation as a life field. They would be back in tomorrow if another war demanded it, but otherwise many do not care much if they ever fly again. A few express the desire that they would like to spend one or two weeks each year flying on some Government field, just to keep their hand in, as they express it.

AS to how closely these pilots are kept to aviation very largely depends on the Government program. The Government must give encouragement; otherwise the great training value of the war largely will be lost.

COULD the Government do anything better than maintain at a score of large population centers and at places of military value flying grounds or airdromes where most of the thousands of planes could be kept? Arrangements could be made so that

every qualified pilot could have permission to fly the machines as necessary. The majority of our pilots would take advantage of such and in so doing be lending a hand to the Government to build up such an aviation reserve as the Nation demands. These pilots would be the force to carry on and bridge the gap between to-day, when the commercial value of aviation is quite uncertain, and tomorrow, when it will have taken shape and when it will require the stimulus of our present pilots.

VERY few of our war pilots have an inclination to become aerial chauffeurs or taxi drivers. They had no thought of graduating into such a class any more than they have in mind driving a taxicab for an existence.

THE aerial chauffeur and taxi driver will call for a different class of pilots, a class drawn from the rank in life that seeks such as a means of livelihood. There are very few of such to-day. They were not the kind that joined the Signal Corps. The Government at once must take up the recruiting and training of this new class of pilot. The daily needs of the Army in peace times will demand such, and the needs of commercial aviation of to-morrow will have great use for many thousands of such. In the meantime let us not lose all we have gained. The establishment of many airdromes and arranging for the free use of them by pilots will go a long way toward accelerating military and civil aeronautics, which are so necessary for our development as a nation.

## The Returned Soldier-Mechanic

ALTHOUGH the labor situation in the repairshops of the country is somewhat better than before the armistice was signed and some of our men were relieved from service, there is still room for many more mechanics in our salesrooms, garages and repairshops. Herein lies a great opportunity. Thousands of mechanics have been made from the raw material and others have been made experts from the ranks of the half-trained "helpers." The dealer should take back the employee who went into service, that is understood, and the dealers as a whole are agreed on it. But, in addition, the dealer should look forward to obtaining more expert and more efficient help from among those who perhaps before they went into service were not in the industry at all but who now may be counted on to swell the great company of automotive workers.

IS there a trade association in your town? Give its secretary a note on how many returned soldier-mechanics you can employ, temporarily or permanently. Some of these boys will be coming back glad to get anything to tide them over until they can be settled permanently in money-making positions. Have you a former employee in the Army or Navy? Write to him and tell him the old place is waiting for him. Perhaps that former employee really needs to return to civilian life and resume the obligations of his family. If so, the knowledge that his old place is waiting for him will make it easier for him to get his honorable discharge and get back at work.

AS far as the soldier-mechanic especially is concerned, the dealer or repair station who employs him will be availing that concern of a big opportunity, besides doing a patriotic act. The old job for the old employee and the new job for the Government-trained mechanic—bear this in mind while you are looking for some one to help you take care of this new business that is coming back with peace times and renewed optimism.

THE shows are here to do a big part of the work in turning the tide of buying back into the field of the car, truck and kindred sales. You, as a live dealer, should be doing your part by individual enterprise, co-operation with the dealers in your town, country, state and county, and in every other way you can think of, even staying awake nights, if necessary, to figure out just how this best can be done. The well-trained mechanic in your service department, in your garage, if you are a garage man, is going to help. The car owner takes his car after he has bought it to the place where he can get the best service with the most economy of time and money. Skilled help will make your place that place, given the attendant system and other necessities. Try the soldier-mechanic, and by all means let your former employee know his old job is at the same old stand when Uncle Sam says the word.

GIVE the returned soldier a chance at his old job by all means. If he is a soldier-mechanic, U. S. trained, so much the better!



# Fifty-Five Makes at New York Truck Show

## Eight New Models That Were Absent from Chicago Exhibition

**N**EW YORK, Feb. 10—Special telegram—Fifty-five makes of complete motor vehicles were exhibited at the truck show which opened here to-day at Madison Square Garden and the 69th Regiment armory. In all 144 vehicles were displayed. Of these eight were new models not at Chicago. Among these were the LaFrance, Shaw, Ward Special, Rowe, Oldsmobile, Columbia, Wilcox and West Electric. In addition to these there were fourteen other makes of trucks not exhibited at Chicago, including the Atlas, Corbitt, Giant, Hall, Kelly-Springfield, Maccar, Packard, Riker, Schacht, Sullivan, Traffic, Wichita, Parker, and Larrabee-Deyo.

There was a noticeable trend toward the increased use of pneumatic tires on trucks up to 2-ton capacity. A large proportion of the chassis shown also were equipped with some form of closed cab. For the first time in the history of the New York motor truck shows farm tractors were on display. There were four such exhibits, including the Maxim, Fordson, National and Emerson-Brantingham. Several novel bodies also were displayed, including pay-as-you-enter bus types; convertible side-stake and side-panel units and special full-panel jobs with interior shelving.

Five makes of converters for passenger cars were shown and three makes of trailers. Many of the parts and accessory concerns which exhibited at the passenger car show the week previous retained their booths but changed the character of their

exhibits to conform with the truck atmosphere.

Fulton exhibited its new 3- to 4-ton tractor-trailer outfit. Columbia showed a new 1-ton internal gear-driven model with a Russel axle and a Continental unit-power-plant engine selling at \$1,750 in the chassis. The LaFrance had but one vehicle on exhibition. This chassis is of 2-ton capacity fitted with a cab. The outstanding features were lubrication of the spring bushings by oil instead of the conventional grease cups and electric lights mounted on brackets attached to the radiator.

There was an entirely new Acme model, a 5-ton chassis with worm-drive and wheelbase of 180 in. This model is powered with a 55-hp. Continental engine, 4½ by 6 in. Among the standard assembly used are the Eisemann magneto, Rayfield carbureter, Timken axles, Borg & Beck clutch and Cotta gearset. The price of this chassis is \$4,750.

The Shaw, a new 2-tonner, is fitted with a Continental 4½ by 5½ engine, Brown-Lipe clutch and gearset, Timken axles and 36 by 4 and 36 by 7 tires. The propeller shaft has three universals and is carried amidships by an SKF self-aligning bearing. A feature of interest is the arrangement of the brake equalizers, which have lubricating bushings. The wheelbase is 153 in. and the price is \$2,950. A ¾-ton truck following the same general design will be marketed soon.

A new 3-ton Rowe is fitted with pneu-

matic tires and is designed to operate at 30 m.p.h. It is fitted with a 3¼ by 5 eight-cylinder Hershell-Spillman engine and has worm drive.

The Wilcox chassis have several minor alterations. All units now have four speeds and in the case of long wheelbase models the propeller shaft is fitted with three universals and is carried at the center on a self-aligning bearing.

The engine of the 5-ton Corbitt is now 5¼ by 5½ instead of 4½ by 5½ as formerly. The price has been increased \$500.

### OLD JOBS FOR SOLDIERS

Detroit, Feb. 10—All former Packard employees who resigned to enlist or who were drafted into the Army while in the employ of that company are being given their old jobs even if it is necessary to displace employees now occupying these jobs. They will get the pay which they would have received had they remained on their jobs. More than 3000 men are affected.

### OLDS BUILDS 140 DAILY

Lansing, Mich., Feb. 10—The Olds Motor Works rapidly are swinging into full production. One hundred passenger cars and forty trucks are being produced daily. Passenger car production will be run up to 150 machines within sixty days and the daily truck output is being increased materially.

Olds is going into the truck business on a large scale. Its new ¾-ton Economy truck is the first built by the company in recent years. The little machine was on display at both New York and Chicago shows. Orders for trucks and cars will tax the company's capacity for sixty days.

### BARTSCH BACK WITH BOSCH

New York, Feb. 10—Alfred H. Bartsch has returned to the American Bosch Magneto Co. after an absence of a little more than a year. He takes up the duties of advertising manager which he surrendered just before this country entered the war and in addition has been appointed the company's general sales manager. Prior to the time he left the old Bosch company, which since has been reorganized, Mr. Bartsch was for more than seven years its advertising manager. He left that position to become affiliated with McLain-Hadden Simpers Co., an advertising agency, and for about a year has made his headquarters in Philadelphia.

### LANSING PLANS SHOW

Lansing, Mich., Feb. 10—Lansing's first truck and tractor show will be staged in the Republic Motor Sales building Feb. 10-15. Trucks, tractors, disk plows and wood buzzers will be on display.

## 3% Tax on Trucks and 5% on Cars

### How Revenue Bill Affects Industry

**W**ASHINGTON, Feb. 7—The 1919 Revenue Bill, taxing cars, trucks, tires, accessories, parts, truck express and taxicabs, among its numerous provisions, was agreed upon yesterday by the conferees and now comes before Congress for approval. It is anticipated that the bill will be passed as it stands. The provisions include a tax of 3 per cent on motor trucks, trailers and the equipment, including tires, tubes and other parts, 5 per cent on passenger cars, including equipment, except on tractors, which are not taxed, and 5 per cent on tires, inner tubes, parts and accessories made for cars and sold to any person other than a car manufacturer. The floor tax on parts originally included is now eliminated.

Taxicabs, which includes all cars that carry passengers for hire, will pay a tax of \$10 with a seating capacity of seven or less and \$20 for machines with a capacity for more than seven persons.

The tax of 3 per cent on motor truck haulage where it competes with rail or water transportation of freight remains in the bill, and in addition there is a tax of 1 cent for each 20 cents paid for motor

truck express where it competes with rail or water express and 8 per cent of the transportation fee for carrying of passengers by motor truck, passenger car or motorcycle when it is in competition with rail or water carriers.

In short, the taxes are:

3 per cent tax on motor trucks and trailers.

5 per cent on passenger cars.

5 per cent tax on tires, parts, accessories and inner tubes.

10 per cent tax on shows.

\$10 annual tax on taxicabs seating seven or less.

\$20 annual tax on taxicabs carrying more than seven persons.

3 per cent of transport cost for freight by truck in competition with rail or water.

5 per cent of transport cost for express by truck or passenger car in competition with rail or water.

8 per cent of transport fee for carrying passengers by truck, passenger car or motorcycle in competition with rail or water.

# Motor Car Surplus That Is No More

## Southern California Used to Worry Over Stored Machines, but Not Now

LOS ANGELES, Cal., Feb. 7—The new year has been marked in southern California by a remarkable stimulation of the automotive business. All branches of the industry have been affected and trade during January showed a very pronounced impetus. In a measure this can be attributed to the recent show in Los Angeles, but as a matter of fact, it reflects more than anything else the returning confidence of the buying public. Money is being brought from out the hiding places and expended for motor equipment. The banks are showing a relaxation of the tentacles that, for a time, looked as if they might throttle the trade, and now the man who desires to withdraw a deposit from a bank to purchase a motor car does not have to go through a lot of red tape and explanation.

There has been such an awakening among passenger car purchases that warehouse stock is being reduced rapidly. Three months ago one big distributor had 400 cars in storage. To-day this stock has been cut down to seven touring and four closed models and a seven-carload shipment is enroute from the factory. With the lower-priced cars and demand, if continued a few weeks, will exhaust the present supply. Dealers, who had been shrouded in gloom, are now aroused by optimism, and already there has been mention of a possible car shortage. Unless the unexpected happens, the stock of several thousand cars that had been accumulating for many months will be cleaned up entirely by the time factories get back to their normal scale of production.

### Wholesale Picking Up

Wholesale business is being resumed. Many of the leading distributors during the final three months of 1918 took their traveling representatives off the road. Sub-dealers were denied cars unless they paid cash for them and showed a bill of sale. These country dealers have had a hard struggle, but most of them managed to hang on and now are in position to come back strong. Distributors are putting out lines for additional sub-agents and again are extending an advertising appropriation to help them out. This part of the country is going to see the biggest rush for trade it ever has known. New lines of cars that have not been able to make much headway against the competition of old favorites are going to have their chance.

Price does not seem to be the determining factor. Dealers who weathered the storm will be in position to capitalize upon the reputation acquired by sticking it out. Cars in the price class of Marmon, Cole, Apperson, Franklin, Cadillac and Stutz are very much in demand. January was the best month in Stutz history. Closed cars have been very much sought for. These models in the Franklin line outsold the open cars 8 to 6 during the month. Buick, Oakland and Chevrolet are leading in their price classes. Between 8:45 and 11 o'clock

one morning eight Oakland cars were sold at retail. Five of these were in one order to a paint company. All were roadsters, and a special carload shipment will have to be rushed from the factory, as the dealer's supply of this model was exhausted.

Heavy-duty trucks and light commercial cars are benefiting by the situation. Increased freight rates will result in the sale of additional trucks. Shippers have learned that with the good roads of southern California truck transportation is cheaper than rail. Activity at the harbor and the restoration of steamship traffic most likely will bring about the construction of a special truck boulevard between the city and port within the year. The stock of high-grade, manufactured trucks at this time is low, but dealers are promised relief soon. All are seeking to get on hand as big a supply as possible before the eastern demand sets in and shipments to this point are curtailed.

### HARROUN BACK ON CARS

Detroit, Feb. 5—The Harroun Motors Corp. is back to 100 per cent peace-time production, planning during February to turn out 200 cars, then 500 and gradually increase the number during the spring and summer until the maximum output is reached. The plant is able to make 250 engines and assemble an equal number of cars a day, double shift. The Harroun plant finished its manufacture of shells for the Government Jan. 31.

Harroun activity for the Government in November showed that 90 per cent of the plant was devoted to shells, 5 per cent to class B truck engines and 3 per cent to Fordson tractors. The whole plant was

working on 10,000 tractor shoes, the creeping type of walking shoe used as a tread on the wheels of the Government 6-ton tractors. Production of these tractor shoes was about 700 a day. Of the contract for 10,000 cylinder water heads for Fordson tractors, 5000 were turned out on an average of over 100 a day. Notwithstanding this Government work, the Harroun plant was able to make 2400 cars from parts on hand. This concern desires to manufacture its car complete in its own plant as far as possible and is seeking a body plant, a transmission plant, a universal joint plant and an axle plant, which, when combined with the present plant will include all the major units necessary for the manufacture of Harroun cars.

### OUTPUT BIG DESPITE WAR

Toledo, Ohio, Feb. 8—Willys-Overland turned out 82,436 cars in 1918, as compared with 140,002 produced the year before. In addition the company completed 42 per cent of its war orders, totaling \$80,000,000.

### BIG ORDERS FOR AUTO BODY

Lansing, Mich., Feb. 8—With orders representing \$1,250,000 on its books, the Auto Body Co. is speeding up production anticipating the biggest business year in its history. A definite schedule of production which will keep the plant busy for three months has been completed. The company is employing 400 men. Six weeks ago less than 100 men were employed.

### FORD MUST DIVIDE DIVIDENDS

Lansing, Mich., Feb. 8—The Michigan supreme court has decided the famous legal action between the Dodge brothers and Henry Ford and the Ford Motor Co., and the decision is a split one. Special dividends, amounting to \$19,000,000 were ordered paid to Ford stockholders by Judge Hosmer in the Wayne county court, and this decree is affirmed. Decrees of the Wayne County courts, stopping expansion of the business of the Ford Motor Co. in



Wayne County, Michigan, not only believes in good roads but also in the appearance of those roads. Its maintenance crew here appears, removing unsightly signs from the trees



its extensive smelting plant at River Rouge are overruled.

In addition the court sustains the contention of Mr. Ford that the laws of Michigan, when they stop organization of a corporation for \$50,000,000, mean for organization purposes only. Capital investments, such as the profits, borrowed money, are not controlled by the law limiting capitalization, the supreme court holds.

The supreme court assesses one-third of the cost of the case to Mr. Ford and two-thirds to the Dodge brothers.

The opinion was written by Justice Russell C. Ostrander. It consists of 20,000 words and quotes at length from the briefs submitted by the attorneys on both sides, from the testimony, from newspaper interviews accredited to Mr. Ford and from letters which passed between the parties at litigation before the actual litigation began.

#### STEWART-WARNER EARNINGS

Chicago, Feb. 8—The Stewart-Warner Speedometer Corp. showed net profits for the year ending Dec. 31, 1918, of \$1,594,664 after Federal income, excess profits and war profits taxes were deducted. As compared with \$1,860,774 for 1917, this is a loss of \$365,110. After dividends were paid, a surplus of \$994,664 remained, as compared with \$1,260,774 for 1917. Net profits for 1918 are equal to 15.94 per cent on capital stock, which was recently raised from a 6 to an 8 per cent per annum basis.

#### \$29,940,780 IS G. M. SURPLUS

New York, Feb. 7—The financial statement of the General Motors Corp. and its subsidiary companies, including five months operation of Chevrolet for the year ending Sept. 30, 1918, shows total assets to the amount of \$208,252,477. After paying all expenses, taxes, bonds, etc., a surplus of \$29,940,780 remains. Gross sales for 1918 amount to \$39,254,396, and gross earnings to \$10,568,245.

As compared with the year ending Dec. 31, 1917, there is an increase of total assets amounting to \$74,462,753 and an increase of gross sales of \$4,433,870.

#### GOODRICH SALES \$123,400,000

Akron, Ohio, Feb. 7—The B. F. Goodrich Co. for 1918 had sales amounting to \$123,400,000, an increase of 40 per cent over last year, an increase of \$12,000,000 over 1917 and trebling the amount of sales for 1914. Federal taxes, maintenance charges and depreciation have not yet been accounted for.

#### LIBERTY-HISPANO-SUIZA ENGINE

New Brunswick, N. J., Feb. 8—About 2000 are still employed by the Wright-Martin Aircraft Corp. on a Government engine contract, which will be completed in about a month. It has developed an airplane engine combination Liberty-Hispano-Suiza and has a four- and six-cylinder car engine completed and in test.

#### PIERCE PRICE GUARANTEE

Buffalo, N. Y., Feb. 8—Announcement has been made by the Pierce-Arrow Motor Car Co. that the prices of their cars and trucks will stay unchanged until Oct. 1.

## Mid-Summer Business at Dullest Time

### Are We Downhearted? Omaha Points to Her Trade and Says No

OMAHA, Neb., Feb. 8—Mid-summer business during the dullest period of the year is what Omaha dealers in motor cars report, and the indications are that their boast is no idle one. The optimism of Nebraska is primarily responsible. This optimism has justified itself in the past and is confidently expected to repeat this year in even a stronger sense.

Toozer-Gerspacher, handling the Dort, Moon and Pathfinder, are already shipping in carload lots to their dealers. Hayward-Cameron reports mid-season business in January and gaining strength every day. Ralph Jones of Card-Adams says his dealers are not waiting for him but are coming in of their own volition to sign up contracts. Jones of Jones-Hansen-Cadillac says contractors in every line are already hard at work, and that the demand for motor cars of every type is far beyond the visible supply. The buying is not artificial, either. Dealers are crowding their distributors and in turn are being crowded by their individual customers.

"If you have a little crop failure," said C. W. Nash of Nash Motors at a big get-together dinner of dealers and their bankers, "you simply spit on your hands and go after business just the same. And you always have a fine business here. I know of no section of the country more productive, or where more product can be consumed, whether motor cars or any other product, than right here in Nebraska."

The Nebraska Oldsmobile Co. led the whole country in sales of Oldsmobile trucks in January, its sales being in fact more than twice the number of its nearest competitor in Oldsmobile trucks. A list of other records would be a calendar of Omaha's row.

It is to the making of such a record as is contemplated that the plans have been virtually completed for the fourteenth annual show here March 10-15. Clarke Powell, manager of every show here thus far, is manager this year also. It is planned to have a special musical night for which the management is arranging for a big chorus. A soldiers' and sailors' night is also on the cards, when service men from Fort Omaha, Fort Crook and those passing through will be guests of the management. Farmers' day is another feature which went strong last year and will be repeated this year. Sales immediately resulting from last year's show totaled about \$5,500,000.

#### NAVY WANTS MACHINISTS

Chicago, Feb. 7—The Navy wants men who desire to become electricians or machinists by trade. Men between the ages of eighteen and thirty-five who have had a small amount of machine shop experience may enter the service and go through a complete machinist's course at the school in Charleston, S. C.

Opportunity also is offered to men between the ages of eighteen and thirty who have had a theoretical knowledge of elec-

tricity and some practical experience. Men enlisting in this branch will be given a complete course in electricity at Hampton Roads, Va. Further information can be obtained by writing to, or calling at, the Navy Recruiting Station, Transportation building, Chicago.

#### RUCK WITH AUTOMOTIVE

Fort Wayne, Ind., Feb. 10—E. H. Ruck, formerly chief engineer of the Cleveland Tractor Co., has been appointed chief engineer of the Automotive Corp. and will have complete charge of engineering and production of the Automotive line-control, one-man farm tractor. Mr. Ruck was with the White Co. when it changed from steam to gasoline and went with Rollin H. White into the tractor business seven and a half years ago.

The Automotive Corp. took over the Royal tractor, a two-wheel machine driven by a pair of lines in the same manner that a team of horses is driven. It is steered mechanically, every operation of the machine being controlled by the two lines. The concern also purchased the assets of the Sun Motor Car Co. at Elkhart, Ind., and has been operating a service department for Sun cars.

#### COMET TO MAKE TRACTOR

Decatur, Ill., Feb. 7—The Comet Automobile Co. has decided to add tractors to the factory production. A new type of machine has been in course of construction and test and shortly will be placed upon the market. There will be no diminution in the output of passenger cars and trucks. Rather, they will be increased in proportion to the receipts of materials and supplies.

#### ROAD RACE REVIVED

Los Angeles, Cal., Feb. 7—March 15 this year is to see the revival of the Santa Monica road race. It will be held by the Motor Car Dealers' Association of Los Angeles with A. M. Young, manager of former events on the course, in charge. The race is sanctioned by the A. A. A. and may be followed by a 100-mile on the Ascot speedway two weeks later.

#### ROAD BILL PASSES SENATE

Washington, Feb. 8—The Bankhead amendment to the postal appropriation which provides \$200,000,000 for highway building was passed by the Senate to-day, which would make available this year \$50,000,000 and in 1920 and 1921 each \$75,000,000.

#### LA FRANCE DROPS PRICES

Elmira, Ohio, Feb. 8—The Ward La-France Truck Co. has reduced the price of its 2-ton truck \$150 and its 3½-ton truck \$175. The present prices are as follows:

	New Price	Old Price
2-ton truck .....	\$3,350	\$3,500
3½-ton truck .....	3,750	3,925

# Kansas City Motor Car Show Big Also

## Indications Are That During Exhibition All Machines Will Be Sold

KANSAS CITY, Mo., Feb. 8—More than 85 per cent of the motor car and truck factories and distributors will be represented in the Kansas City car show, Feb. 24-March 1, the three-story show in Convention Hall. There will be 300 exhibits, fifty more than at the 1918 show; 200 cars and trucks will be on the floors. There are fifty-eight exhibitors; eleven of these show both cars and trucks, twenty-two show trucks only, forty-seven show cars only. There will be twenty-seven makes of trucks and fifty-nine makes of cars. The demand for space was so strong that only eleven exhibitors got more than a single space of 400 sq. ft. for displays.

There will be two full balconies erected in Convention Hall to accommodate the displays this year. Accessories will be shown on the first balcony, and some light trucks will be on the second balcony.

It is predicted that by the time the show closes there will be no cars for sale in Kansas City. Usually this city distributes \$30,000,000 worth of cars in a year; in 1918, this figure fell because of short supplies to \$25,000,000. There are said to be fewer than 2000 motor cars in Kansas City for sale now. Fine weather in late January and early February has brought the public onto the roads and caused the current of purchasers to set in.

### Big Meeting Feb. 27

The big meeting of the week will be Feb. 27, when David Beecroft, directing editor of the Class Journal Co., Ned Jordan of the Jordan Automobile Co., and Harry Moock and F. W. A. Vesper of the N. A. D. A. will be the chief speakers. The Society of Automotive Engineers will meet during the week.

Within the last ten days distributors have observed a distinct increase in the demand for cars. Their predictions that this demand was coming are being fulfilled somewhat ahead of schedule and in even larger degree than they had hoped. Many distributors have been extra cautious in sending forecasts east, for the dealers in the small towns have been slow, chiefly because of uncertainty as to prices.

Just at this time, two weeks before the Kansas City show, the prospects for 1919 business are just beginning to loom up.

One problem is left, the former problem of selling cars being removed. The remaining obstacle to trade is the lack of aggressive and competent dealers. Distributors are hoping that men returning from the war, who have advanced in personal initiative and in executive ability through army responsibilities, will be led into the motor car and truck business. It is expected that the Kansas City show may be instrumental in directing the attention of many such men to the industry, men who let go their former business connections upon going to war and have not yet entered new lines. Some of these doubtless have been waiting to find out whether motor

car and truck business would be worth going after this year; present outlook is that the business is highly desirable.

Manpower is a problem with reference to mechanics and operators of trucks and trucks and tractors, also. But this is being rapidly solved. Apparently the supply of mechanics will be largely increased during the coming year by returned soldiers.

### AIR SHOW FOR CHICAGO

Chicago, Feb. 10—New York is not to be alone in staging an aeronautical show this year. Chicago will hold its first airplane show at the Coliseum March 29-April 5. Louis Disbrow is the promoter of the enterprise. He will show a medium-priced machine, which he says will weigh only 300 lb. and have a wing spread of only 17 ft. The Motor Products Co., Detroit, is to make this plane and sell it for \$1,000. Another feature is to be a seaplane built in Milwaukee and intended for use in passenger service between that city and this in the spring.

The Milwaukee plane is to carry twenty-five passengers, according to Mr. Disbrow, and make the trip in 50 min. at \$25 per. Associated with him is George W. Browne of Milwaukee, Wisconsin distributor for Willys-Overland and distributor in Wisconsin and Illinois of Curtiss planes. Four Curtiss planes have been promised. Disbrow and Browne have formed the International Airplane Exposition Co. and may put on similar shows elsewhere. Bart J. Ruddle will manage the show.

### OKLAHOMA: LET'S GO

Oklahoma City, Okla., Feb. 7—"Let's Go!" is the slogan for the first automotive show to be held in this section, which will take place here Feb. 18-22 under the

auspices of the Farm Power Equipment Club and the endorsement of the Motor Car Dealers' Association.

A special building for the exhibition has been erected. It will have 54,000 sq. ft. of floor space. A hundred workers were employed, and so fast did the job go it was finished two days after the contract was let. Twelve kegs of nails were used every 30 min.

Five weeks before the show two-thirds of all the space was sold. This is more than was sold for the two shows of the farm power and motor car men in 1918 two weeks before the events. Ray Haun is manager.

### WILMINGTON SHOW DELAYED

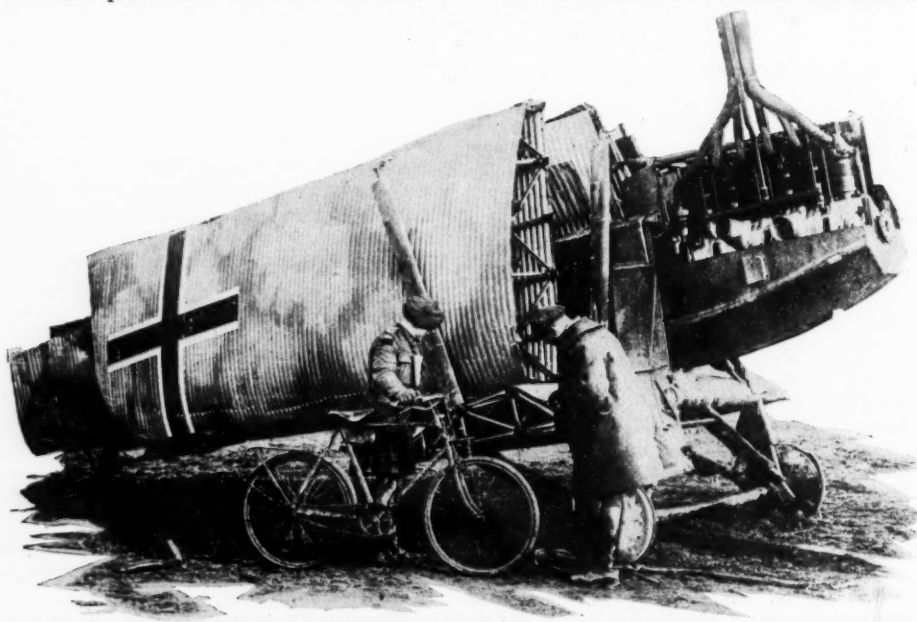
Wilmington, Del., Feb. 7—From present indications the Wilmington show cannot be held before April, being contingent on the completion of the new addition to the Hotel du Pont, the ballroom of which is to be utilized for the purpose. Herebefore the shows have been held in January, the logical time, but the local dealers have decided that sentiment will cut no figure this year and that they will have the show just as soon as they can.

As the new ballroom will give more space than was ever used for purpose before, it is believed that it will be possible to accommodate every dealer in the city and also to take in the tractor and other affiliated industries, which have not been included heretofore. So, measured by results, everybody concerned believes it will be better to wait rather than take a smaller hall, which would be the only alternative.

### DES MOINES OUTLOOK BRIGHT

Des Moines, Feb. 7—Des Moines this year will have a show such as it has never had before. In years gone by it has held its exposition in a building of the auditorium type, but this year it has secured the new Ford building, which gives it a trifle in excess of 113,000 sq. ft. of floor space. This is more than five times the floor space in the old coliseum, and it has all been taken by exhibitors.

One of the bits of news about the show is



Two Canadians inspect a German plane made entirely of tin except for engine. This machine was brought down in action



that President Dean Schooler of the Des Moines Automobile Dealers' Association will be able to participate in the management of the show along with Manager C. G. Van Vliet. Mr. Schooler has been in military service but has been able to secure his release in time for the show week. The show will be held Feb. 17-22, and while this is the same week as the Minneapolis, St. Louis and some other expositions, the conflict does not seem to be making a great deal of difference, and there is every prospect for the biggest show that Des Moines has ever had.

#### BUFFALO SHOW PLANS

Buffalo, N. Y., Feb. 8—Requests for space far in excess of previous years are being received by the managers of the Buffalo show, which is to open at the Broadway auditorium here, March 3. In addition to the regular display of cars there is to be a comprehensive exhibit of commercial vehicles and accessories.

Numerous dealers have signified their intention of displaying to better advantage the closed type cars this year. This type of car during the last year has made rapid strides in popularity and is selling in numbers that rival the open types.

#### GOVERNORS ENDORSE ROADS

Washington, Feb. 7—Governor after governor is coming out pronouncedly for real road programs for the immediate future. Governor Davis at a Virginia good roads convention not long ago received an ovation when he put forward the proposition of raising \$25,000,000 for the building of 1200 miles of state highways. He frankly admitted that he wanted to be known as the good roads governor of Virginia.

Retiring Governor Capper, who next takes a seat in the Senate, out in Kansas thus expressed himself, "Cheap and quick motor transportation of products from and to the farm is coming. It is to be our next big development. Highways building in our agricultural states offers the way for employing thousands of our men who have seen, and have repaired, and have rebuilt many of the magnificent roads of France."

New Jersey's Governor also comes to the Senate when the next Congress meets in Washington. Senator-Elect Walter E. Edge is avowedly a believer in nationwide roads development, recently putting it into these words, "The Federal Government is in a better position than any state or combination of states to assume a directing generalship over highways of the whole nation, supplying the missing links here and there and directing new extension in such a way that available undeveloped land will be opened up to the touch of agriculture. Furthermore, the nation's enormous aggregate expenditure on roads will be divested of that wanton waste which is the project of gross mismanagement and selfish motives."

Governor Robertson of Oklahoma hopes to induce the legislature to adopt a \$40,000,000 bond issue for the purpose of supplying the Indian State with a connected road system. It is his idea that interest and sinking fund can be met chiefly through the production tax from oil and the registration tax from motor vehicles.

## New York Finds Show Very Satisfactory

### Canvass of Dealers Exhibiting at Gotham Event Polls Good Results

NEW YORK, Feb. 8—A booth-to-booth canvass of the passenger car exhibitors at Madison Square Garden and the 69th Armory made this afternoon—the last day of the passenger car show—disclosed a universal satisfaction with the results. One exhibitor stated emphatically that this was the best business show in an experience covering eleven years. Another stated that "cars are selling like hot cakes—if not faster" and yet a third gave his opinion that the only conceivable limit to 1919 business was in relation to the supply of raw material.

Every class of car exhibitor was interviewed. High-priced cars with custom bodies, high-priced cars with standard bodies, cars of moderate price and cars selling at a popular figure were investigated. Every exhibitor in all classes was equally optimistic as to the future and equally enthusiastic on the subject of actual sales.

Arising out of the matter of sales, the subject of the dealers' frame of mind regarding his future was discussed with exhibitors. Without exception, the opinion was expressed that the trade selling end of the industry had been stabilized by the guarantee to maintain present prices and that any timidity on the part of the dealer as to the possibility of unexpected change was finally dispelled. Indications point to the fact that the dealer has realized to the full the desirability of making early arrangements covering his 1919 requirements of passenger cars, or such portion thereof as there is a reasonable prospect of his securing, and hence the volume of show sales.

The approximate attendance at the show was 129,000. The number of dealers registered was about 2000.

#### Jobbers Are Cleared

NEW YORK, Feb. 7—The much talked of trial of the jobbers has come to an end, and they all have been found not guilty.

The jury in the United States District Court for the Southern District of New York gave the whole outfit a clean bill of health to-day after deliberating less than a half hour. The trial began Jan. 13.

By this verdict the twenty-one members of the Automotive Equipment Association, formerly the N. A. A. A. J., and about half as many corporations are freed from all charges of monopoly and restraint of trade under the Sherman law, and indications are that the association will now go forward into a great future. Its growth and activity has been somewhat restricted during the time the trial has been pending.

The Sherman law charge has caused the association to be a mysterious quantity in the trade since the finding of the indictment Aug. 30, 1917. Prospective members have hesitated to join, not knowing what the status of the organization would be.

Judge Hand, in charging the jury, touched on most of the operative resolutions of the association and stated that of themselves they were not in restraint of trade and that they meant little unless there were some ulterior intent proved. The association successfully contended that it is not a price-fixing organization and has not monopolistic ambitions. Realizing, however, that some of its motives have been misconstrued, the organization now proposes to give a more definite understanding of its ideals with the object of continuing the trade betterment work it has been doing since its beginning.

The defense used only three witnesses, ex-presidents Sidney F. Beech, T. M. Brooks and Charles E. Feath, each of whom explained the trade work the association has attempted to perform. Chief among the witnesses for the prosecution were syndicate catalog men, purchasing agencies and others who have had differences with the association's members.

#### MICHIGAN ROAD BONDS PROBABLE

Bay City, Mich., Feb. 8—A concrete road, extending from Chicago through southern Michigan with Bay City as its terminal, to be known as the Victory highway, may become a reality if the present plans of men interested reach fruition. With the possible exception of a small stretch from Lansing to Owasso, the entire route of the proposed highway has been decided upon.

Good roads men of thirteen counties met in Lansing recently and made plans for a big meeting Jan. 29. The Bay City board of commerce chartered a special car to convey its delegation of fifty "live wires" to this meeting. Every county in the state wanted to be represented, as enthusiasm in the project runs high.

The state legislature has adopted a resolution to submit at the spring election a \$50,000,000 bond issue to be spent in providing Michigan with a network of truck-line concrete highways. Plans for these lines were laid out and a survey made as a result of legislative action several years ago.

#### TRACTOR MEETS TROUBLE

Columbus, Ohio, Feb. 7—The Columbus Tractor Co., organized last April with an authorized capital of \$1,000,000, has stopped the manufacture of farm tractors and is planning to enter some other line of manufacturing. The plant has been shut down since November, when it was discovered that the tractor was mechanically imperfect and many machines were coming back.

#### STOUT TO MANAGE SALES

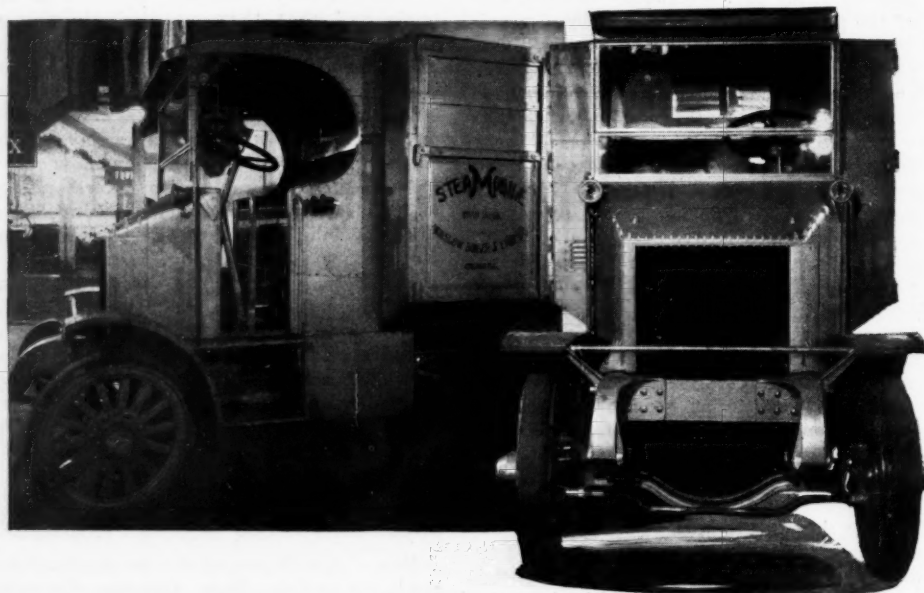
New York, Feb. 7—W. B. Stout, formerly of the Packard Motor Car Co., has been appointed sales and advertising manager of the United Aircraft Engineering Corp.

# Simplicity Found in Latest Trucks

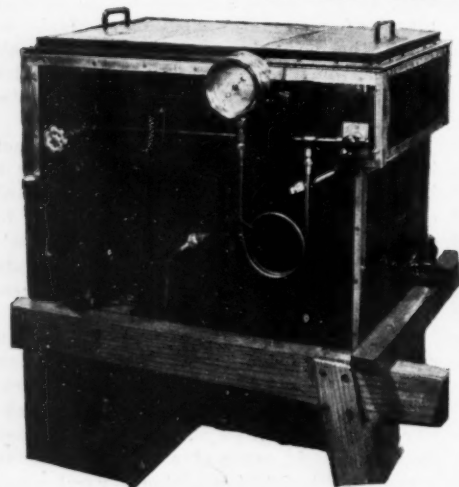
New Models at Chicago Show  
Consideration of Operating Cost

By B. M. Ikert

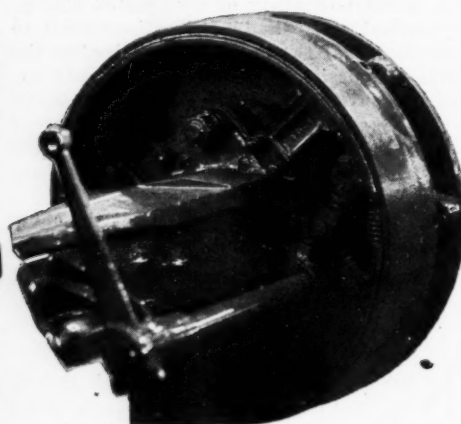
Motor Age Editorial Staff



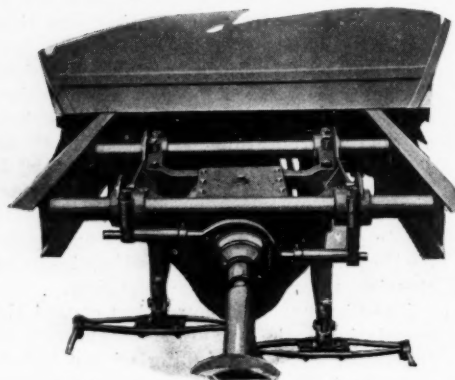
On the Winslow steam truck the condenser is at the front in place of radiator.  
The engine is under the floor of the cab



Close-up of horizontal water-tube boiler on new Winslow steam truck



Detail of new triple-brake toggle on Torbensen axle on 3½-ton Republic truck



Unusual mounting of gearset on the new Oneida 5-tonner

their chassis, possibly with the service and maintenance angle in view, working hand in hand with the sales department to carry out a plan of maximum truck-earning capacity with the smallest possible operating cost.

Engines show slightly more horsepower in many of the trucks over those of last year, the bore having been increased on the average something like ¼ in. There have been substitutions of engines on some models, that is, concerns that used one make of engine last year have changed brands this year. Right in line with engines mention might be made that automatic control of engine temperature has not been developed as far as it might be. To secure greatest engine efficiency under all climatic conditions it is almost certain that in a year or two we shall find big strides in the way of automatic devices to juggle the heat for carburetion devices. Closely allied to this is some means for keeping the cooling water at the most efficient temperature.

Side chains for trucks are going out of style for either the worm internal gear or bevel gear drives. In the bigger sizes of trucks there is a tendency for the four-speed gearset, while Hotchkiss drive is just as popular as ever with the smaller trucks. On the 5-ton jobs radius rods are used to take the drive. Springs comparatively flat under load and better brake mechanisms have made the Hotchkiss drive popular on the smaller sizes.

As in passenger car practice, many of the truck makers are using oil cups in place of the grease variety on the spring shackle bolts and similar chassis members. Where grease is still used in some cases the job of filling the parts with grease has been made much easier by the Alemite process in which the chassis is supplied with fittings to which the nozzle of a grease gun screws, the grease being forced easily in place without soiling the hands.

The exhibits also showed a greater tendency toward the increased use of inclosed cabs. Over half a dozen makes were shown with some form of either curtain or built-in cabs. The use of such cabs gives the dealer a good selling argument in that they result in a greater truck work ability by keeping the driver in the best physical trim.

## Available

Two new models of Available trucks had several departures in design, including a new method of brake equalizing, a new method of front axle mounting and a two-step runningboard. The brake equalizing is accomplished by two flat equalizer rods, one above the other, which run in slotted members fastened to the under side of the frame near the midpoint of the chassis. These rods move forward in a longitudinal

CHICAGO, Feb. 7—One of the things gleaned at the truck show which closed Thursday night was that the standard U. S. truck has not as yet made serious inroads on the designs of commercial vehicles generally. Trucks are much the same as we found them a year ago and it is not likely that Government truck constructions or modifications thereof will manifest themselves in commercial vehicles until truck concerns have put through present orders.

While it is true several concerns showed models at the show for the first time, no radical departures from conventional design were in evidence. However, one thing is certain—makers have sought to simplify



direction as the brakes are set and backward as they are released. The Timken rear axle used has two brake shoe segments in each drum, and under the ordinary method the two forward shoes are moved into contact with the drum when the emergency brake lever is pulled and the two rear shoes when the foot pedal is used. This sets up a strain in the axle which the Available company has overcome by connecting one of the rear shoe rods to the transverse equalizer rod on one side and one of the front shoes on the other side, tending to equalize the entire action. The front axle of each of the models is set on a slant from the front to the rear by making the rear end of the spring lower than the front. When an obstruction is encountered, the wheels tend to mount it without the strains set up when the axle is set level. The steering arm knuckle also is set over the center line of the axle so its arc of movement is very small when the spring is deflected. This gives an easier steering truck.

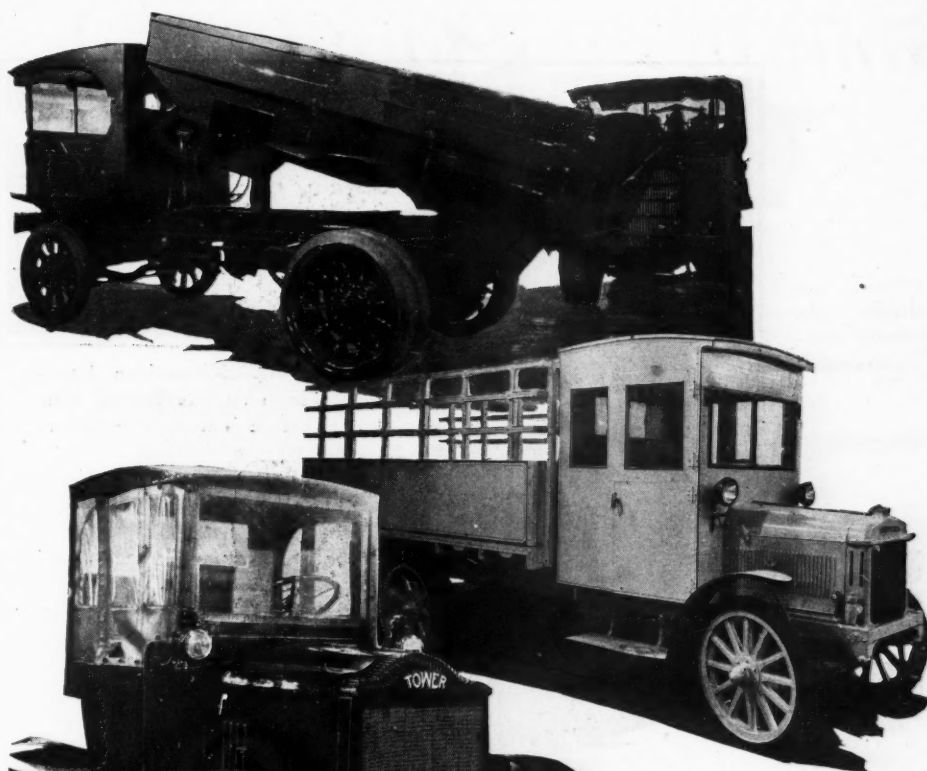
## Tower

The latest model of the Tower truck, the  $3\frac{1}{2}$ -ton model G, was shown for the first time. This is a 165-in. wheelbase job powered with a four-cylinder  $4\frac{1}{2}$  by  $5\frac{1}{2}$ -in. Continental engine. In unit with this is a four-speed Fuller transmission and clutch. Front and rear axles are Timken, the latter worm driven and carrying 21-in. duplex internal expanding brakes. The propeller shaft is a Spicer tubular, with three universals, the intermediate being located just behind a staunch cross member on the frame. The frame is 7-in. channel with exceptionally well-constructed methods of attaching radius rod supports, spring brackets, etc. The radius rods are I-beam section, bushed with steel. Front and rear springs are 55 and 56 in. long respectively, and each leaf is slightly concave throughout its length, forming a natural grease channel. The end of each leaf is formed to act as a grease cup. The spring bolts are lubricated by wick oilers. The tires are 36 by 5, front and rear, the latter dual. There is a 14-ft. loading space back of the cab. Equipment of the Tower includes a Stromberg carbureter, Bosch magneto and Ross steering gear. Model F, also shown, is substantially the same except the units are smaller to accommodate the relatively smaller carrying capacity.

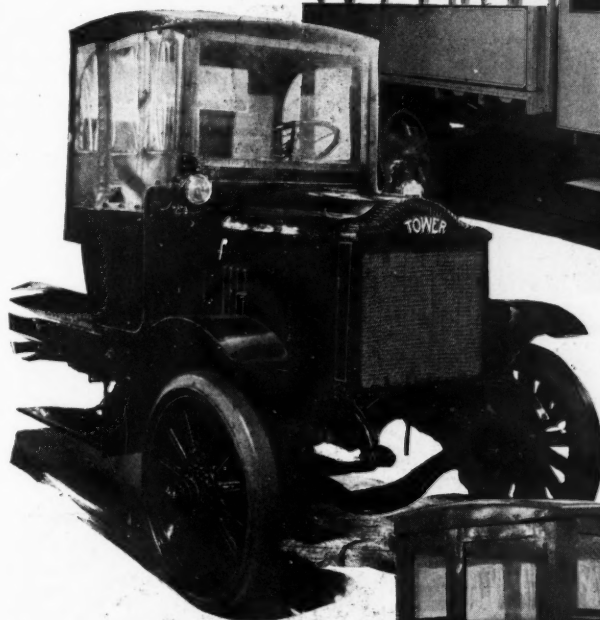
## Master

Seven Master trucks were exhibited by the Louis Geyler Co., Chicago, two of which, the 1- and 5-ton, were new jobs. This was the largest display at the show. The Master Junior, as the  $1\frac{1}{2}$ -ton is called, has a 142-in. wheelbase with a loading space of 120 in. It carries a Buda  $4\frac{1}{8}$  by  $5\frac{1}{2}$ -in. engine, three-point suspended in the frame, the latter being braced with five cross members. The rear axle is an internal-gear Torbensen with M. & S. locking differential. This model, however, also can be had with a worm-gear drive. Tires are pressed-on type, 34 by  $3\frac{1}{2}$  front and 34 by 5 rear.

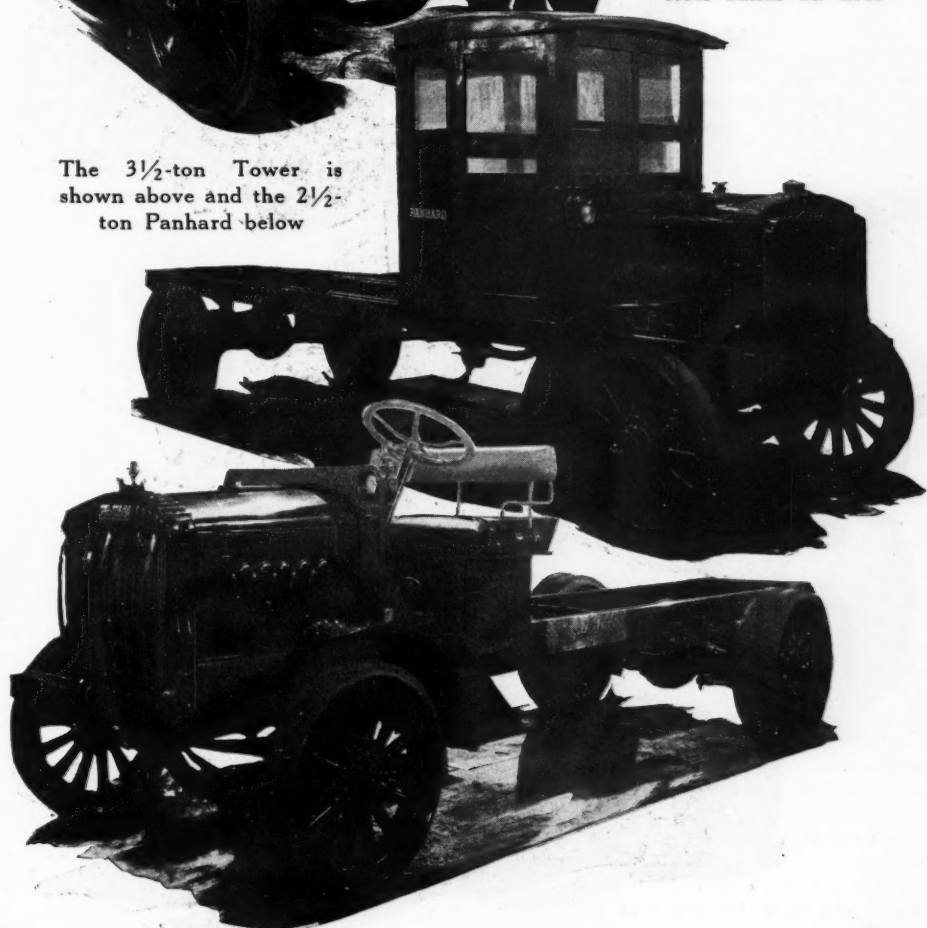
The new 5-ton Master uses a steel frame 10 in. deep, with a loading space of 14 ft. behind the driver's seat. The wheelbase is



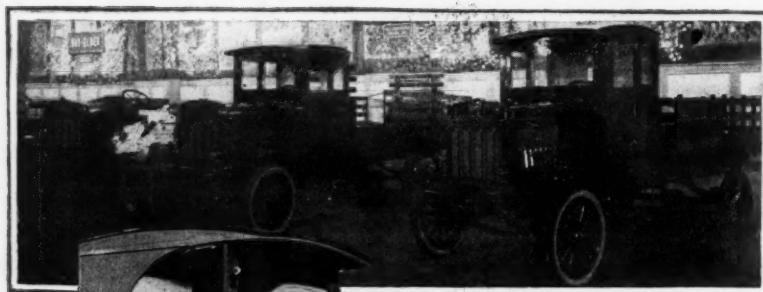
Just above is the 2-ton Mutual, while above it are the 6-ton Garford with special coal body and the  $3\frac{1}{2}$ -ton Garford with detachable steel bands on tires



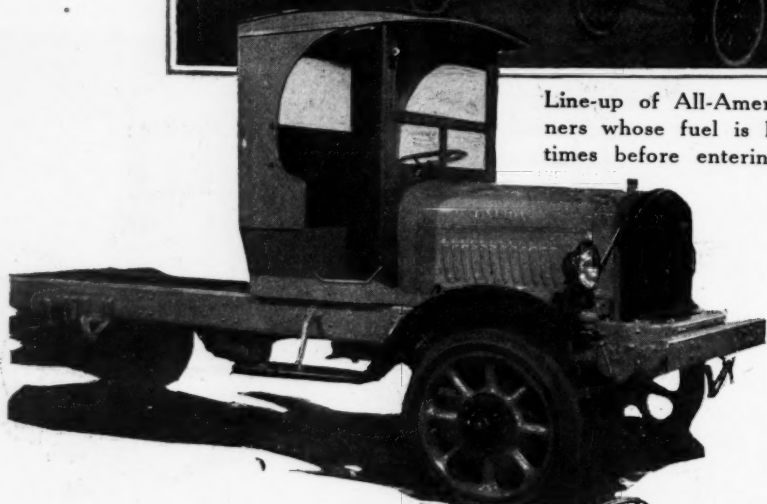
The  $3\frac{1}{2}$ -ton Tower is shown above and the  $2\frac{1}{2}$ -ton Panhard below



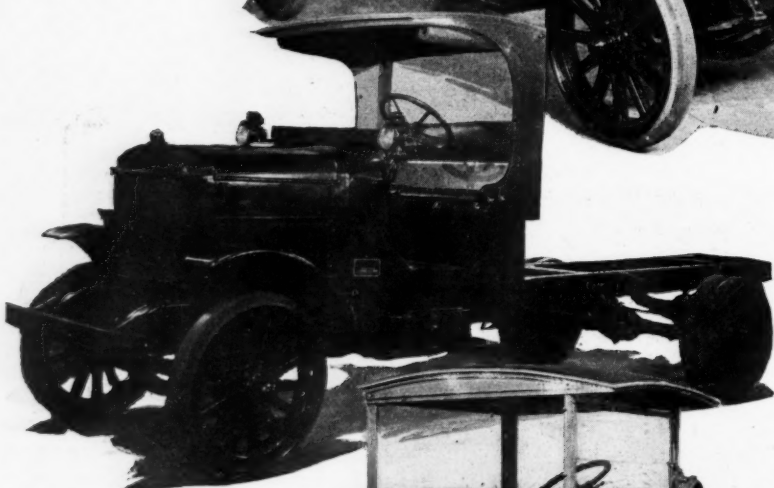
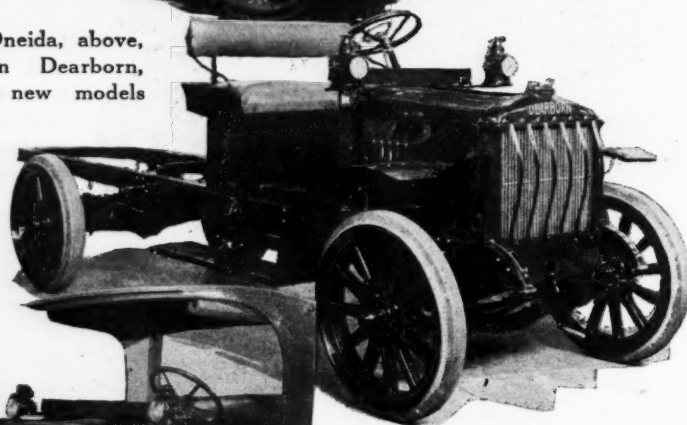
The Available  $3\frac{1}{2}$ -ton truck with two-step running board and tilted front axle



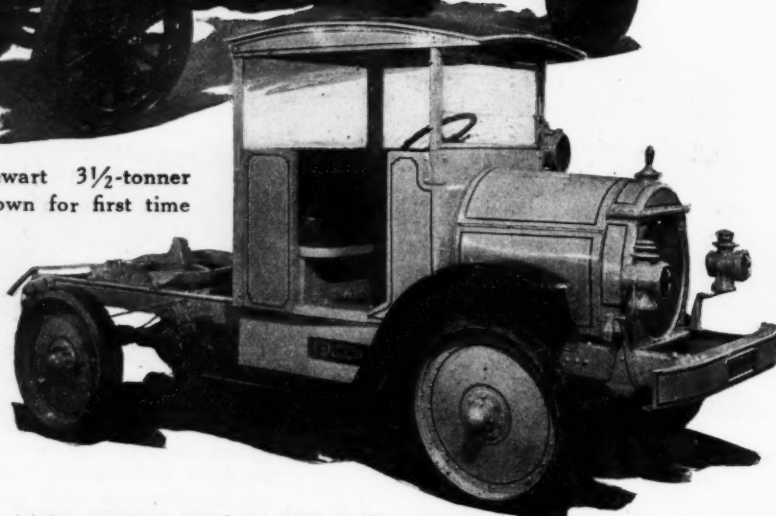
Line-up of All-American 1-tonners whose fuel is heated four times before entering cylinders



The 5-ton Oneida, above, and 1½-ton Dearborn, right, were new models



Stewart 3½-tonner shown for first time



New Fulton tractor and closed cab

170 in. The power unit takes in a Buda YU 4½ by 6-in. engine with Brown-Lipe clutch. The gearset, also Brown-Lipe, is amidships. It is a four-speed job with a final axle gear reduction on high of 10.75 to 1. The rear axle is a worm-driven Timken with pressed steel housing. The front axle is also a Timken, I-beam, having taper roller bearings in wheel hubs and steering knuckle heads. Steel wheels are a feature, carrying tires 36 by 6 single solid, front, and 40 by 6 dual, rear. The spring suspension is in keeping with the heavy-duty requirements of the truck and all spring eyes are bronze-bushed. The rear spring eyes are 1¼ in. in diameter. Other features of this job are an Eisemann magneto with automatic advance, Master 1½-in. carburetor with Pierce governor, Spicer universals in connection with a 2½-in. tubular driveshaft, 25-gal. fuel tank under seat. Equipment includes three lamps, folding crank toolbox, tool kit and siren whistle. This model also can be had with a longer wheelbase at extra cost.

## Dorris

Two Dorris trucks revealed the usual sturdy Dorris construction with such features as five-bearing crankshaft in engine, valves in head and superheated manifold. Intake and exhaust manifolds are united, so the incoming gases are drawn directly against this superheater, to assist in vaporization. The new 2-ton Dorris has a 4¼ by 5½-in. four-cylinder engine. Oiling is full pressure and ignition by Bosch magneto. The clutch is a multiple-disk type, with four-speed transmission amidship. There are two independent driveshafts with Spicer universals. The springs are semi-elliptic, the front 42 in. and the rear 56. The front axle is a Timken I-beam and the rear a Timken-Davis Brown worm gear inclosed in a pressed steel housing.

The steering gear is a Ross, of the worm and nut type, with a 20-in. wheel. Full electrical equipment is one of the Dorris features and consists of a 6-volt 130-amp. Willard battery, Westinghouse generator and starting motor with Bendix drive, etc. This equipment, however, comes extra. The truck has a 144- or 162-in. wheelbase, optional with the purchaser, at the same price. Wood wheels are fitted, with pressed-on tires, 36 by 4 single front and 36 by 7 single rear. Dorris trucks are designed so that 30 per cent of the load is carried on the front wheels and 70 per cent on the rear.

## Mutual

In bringing out the new Mutual, shown for the first time at the Chicago show, attempt has been made to balance one unit against the others. The 2-ton job shown incorporates a Detroit steel frame, Wisconsin 4¼ by 6 engine, Wisconsin worm-driven rear axle, Sheldon front axle and Smith metal wheels as regular equipment. The engine is equipped with a Bosch impulse starter magneto, Stromberg carburetor, Duplex governor and the Vesta electric lighting system. Amidships is located a Fuller four-speed transmission, taking the drive from a Hele-Shaw clutch. The steering gear is a Ross, while cooling is taken care of by a Perfex radiator, of the cast tank type. Goodyear tires, 36 by 4 front and



rear are fitted, the latter being dual. An inclosed cab is furnished as standard equipment. The gasoline tank holds 25 gal. and the oil tank  $2\frac{1}{2}$  gal.

## Panhard

There are several features in the new  $2\frac{1}{2}$ -ton Panhard not found in previous models, which are of the 1 and  $1\frac{1}{2}$ -ton type. The newcomer uses a Buda HU engine,  $4\frac{1}{4}$  by  $5\frac{1}{2}$  in., three-point suspended in the frame, which is of a twin construction. All the spring bolts are lubricated by the Alemite high-pressure system. The propeller shafts on this job have been made with a big margin of strength. There are three universals, with the center joint mounted on a S. K. F. self-aligning bearing. All the spring eyes are bushed with bronze and double wrapped. The  $2\frac{1}{2}$ -ton Panhard has a 150-in. wheelbase, 34 by 4 solid single tires in front and 34 by 6 solid dual in rear. The rear axle is a Torbensen, internal gear with Timken bearings. The gear reduction on high is 9 to 1. Inclosed cab for driver comes as standard.

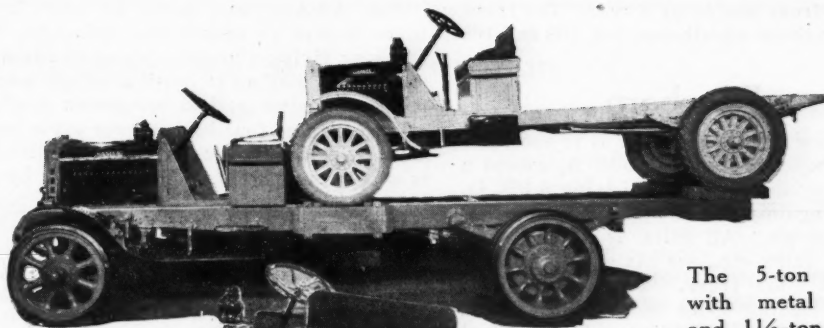
## Fulton

The Fulton Locomotor shown in connection with the Fulton  $1\frac{1}{2}$ -ton truck is constructed much like the latter, although the units have been made heavier in many respects to take care of the additional strains to which this outfit is subjected. The rear of the Locomotor carries a fifth wheel, so a trailer can be attached. The frame, although shorter than the truck frame, is sturdier, and the job carries steel wheels in place of wood. The axles are heavier, there are oil cups instead of grease cups on the spring bolts, the gearset is stronger, and there is a slight difference in the brake layout, the operating rods and levers being located on a frame cross member in place of the rear axle. The engine is the same as in the truck, a  $3\frac{3}{8}$  by  $5\frac{1}{8}$ , L-head in-block type. A Russel rear axle is used.

## Jumbo

The Jumbo truck made by the Nelson Motor Truck Co., Saginaw, Mich., exhibited for the first time at any show features a straight-line drive from engine to rear axle. This is done in connection with a three-joint propeller shaft, and the engine has been mounted in the frame so the rear is a trifle lower than the front, 2 deg. to be exact. A larger hood and larger wheels than on last year's trucks are also features on the new truck, which is a 2-ton internal-gear driven job. The engine is a  $4\frac{1}{4}$  by  $5\frac{1}{2}$ -in. Buda with Zenith carbureter and Eisemann magneto.

Oiling is force-feed and cooling by centrifugal pump. In unit with the engine is a Fuller clutch and gearset, with three speeds forward. On direct drive the gear ratio is 9 to 1. The rear axle is a Clark, while the front axle is a Shular, I-beam. Hotchkiss drive is used. Front and rear springs are semi-elliptic, 40 in. and 54 in. long respectively. The steering gear is a Jacox, adjustable for wear. The finish is standard Nelson gray; the chassis being cleaned, primed, painted, rubbed and varnished. The wheels are Prudden with tires



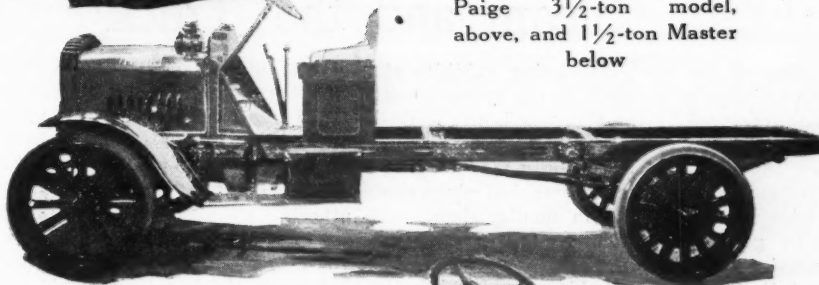
The 5-ton Master with metal wheels and  $1\frac{1}{2}$ -ton Master with pneumatics



The  $3\frac{1}{2}$ -ton Republic with pneumatics all around



Paige  $3\frac{1}{2}$ -ton model, above, and  $1\frac{1}{2}$ -ton Master below



This is the 2-ton Republic with radiator and other detail changes

36 by 4 front and 36 by 7 rear. The truck comes in three wheelbases, 144, 168 and 108 in.

## Dearborn

The new Dearborn model B is the same general construction as model A, except a larger engine is used, this having a  $3\frac{3}{4}$  in. bore as against  $3\frac{1}{4}$  of model A. Model B is a 2-ton job. All units, as clutch, transmission, axles, etc., are the same as in the previous 1-ton truck. These two trucks have a loading space of 9 to 10 ft. and carry tires 32 by  $3\frac{1}{2}$  in. solid. The final drive is by chains from jackshaft.

## All-American

The new 1-ton All-American has a 130-in. wheelbase and carries 33 by 4 pneumatic tires in front and 32 by 4 solid rear. There is a loading space of 104 in. The engine is a four-cylinder,  $3\frac{1}{4}$  by 5, cast in block and three-point suspended. Gasoline or kerosene can be used. Lubrication is force feed and cooling thermosyphon through radiator with cellular core and cast tank. A dry-plate clutch is used, while the transmission, a three-speed selective set, is located amidships. Ignition is by high-tension magneto. The wheels are of wood, with steel optional. Hotchkiss drive is used, with tubular shaft. The rear axle is internal gear driven with a total gear reduction on high of  $6\frac{1}{2}$  to 1. The steering gear is of the worm and nut type, using an 18-in. wheel. Equipment includes headlights, taillight, warning signal, jack, tire repair kit and tools.

# Steam and the Truck

One of the most interesting exhibits at the Chicago truck show, is the steam truck manufactured by the Winslow Boiler & Engineering Co., Chicago. The truck is of 5-ton capacity and is the only model being produced at the present time, but plans are under way to produce in smaller sizes.

In general appearance this truck resembles very much the ordinary 5-ton truck and the layman probably would think it such. It has all the earmarks of a gasoline truck, radiator, worm-drive, and control levers, not excluding the method of operation, all look and operate like the gasoline truck. Massive construction is one of the distinguishing features. The wheelbase is 180 in. The fuel is kerosene.

The important part of any steam-propelled vehicle is the boiler. The Winslow boiler is of the water tube type and in appearance resembles the Babcock & Wilcox marine boiler. The tubes are of seamless cold-drawn steel, set slightly at an angle with the horizontal to facilitate water and steam circulation. The gases pass by the sixteen generating tubes twice, and at the end of the first pass encounter the upper four rows of superheater tubes, which increase the steam temperature 100 deg. The temperature of the steam at the boiler pressure of 600 lb. is about 700 deg., and this together with the 100 deg. of superheat gives a steam temperature of about 800 deg. There are twelve sections in the boiler, each one with the sixteen generating tubes and four superheat tubes, these

The All-American heats its fuel four times before it enters the cylinders, in this way giving a greater degree of vaporization and making it possible to get more miles per gallon and to use poorer grades of fuel. These four heatings are made possible by mounting the gasoline tank directly above the engine under the hood; by a hot-air jacket around the air intake pipe leading to the carbureter; by passing the gas through the cylinder block after it has left the carbureter and by then making it impinge on the hot sides of the intake manifold, which is cast integrally with the exhaust manifold.

## Republic

The Republic trucks revealed several important changes over last season's line. Although the trucks look much the same as the former models, closer inspection shows the company using the Continental engine again as it did formerly. Also the rear spring mounting has been improved much after the same fashion as was done in the Government trucks. There is now a spark control mounted on the steering wheel, and driving has been made more comfortable by placing a footrest under the accelerator pedal. A four-speed transmission is used and the differential is equipped with a locking device. The rear tire size has been increased to 7 in. In addition to these changes there have been refinements throughout the chassis and the capacity of the water system is increased. A slight change also has been made in the brake-operating mechanism, a toggle being now used.

give a total heating surface of 150 sq. ft. The bottom part of the front header extends down lower than the tubes by several inches, and this part of the boiler acts as the economizer. The boiler is located directly back of the driver's seat and is attached to the frame of the truck.

The engine is of the uniflow, poppet-valve type. It is of the V type, four-cylinder and single-acting. This construction eliminates the trouble due to the blowing of the steam gland on the piston rod. A camshaft controls the action of the steam admission poppet valve. A very ingenious and simple scheme is contained in the camshaft control. The cut-off can be varied from 5 to 100 per cent by sliding the camshaft endways. If slid the other way, it will reverse the engine. A worm drive is attached to the camshaft to drive the feed pump. The admission end of the engine is kept at boiler temperature by steam jackets and the exhaust end at exhaust temperature. This is possible only because the engine is of the uniflow type, the steam coming in at one end and exhausting at the other end.

The engine is located under the hood and drives through a propeller shaft to a worm gear drive on the rear axle which has a gear reduction of 11.75 to 1. At a normal boiler pressure of 600 lb. the driving torque through this reduction is 13,200 lb. in. and at the emergency gear reduction of 41 to 1, which is furnished for exceptionally severe service, the torque is 46,300 lb. in. which is

sufficient to drive the truck up a brick wall provided traction is obtainable. The Sheldon axle is employed.

The feed pump is driven from the engine camshaft through a worm gear reduction. The pump is of the piston type and is capable of supplying at an engine speed corresponding to 12 m.p.h., 1200 lb. of water an hour. The boiler consumption is 600 lb. maximum, so ample capacity is furnished by the pump. The feed pump is located on the left runningboard, rigidly fastened to the frame.

The condenser is of the cellular type. The steam from the engine is led directly to the condenser and from there to the feed water tank. The Vesta battery is used in conjunction with the Wagner motor and generator. A small motor pumps the fuel to the burner under low pressure and provides the air for the burning. A small fan blade first subdivides the fuel as it emerges from the fuel line, and then another fan blade attached to the other end of the shaft furnishes the air at a sufficient velocity to atomize the fuel. One spark plug is provided to ignite the fuel in the combustion chamber. Headlights and taillight are part of the regular equipment.

The truck will sell for about \$5,500.

## HAYSSEN HEADS STERLING

Milwaukee, Wis., Feb. 10—R. G. Haysen, secretary and treasurer of the Sterling Motor Truck Co., Milwaukee, was elevated to the presidency at the annual meeting of stockholders. He succeeds Victor L. Brown, who has retired from active business. E. M. Sternberg was elected vice-president and Frank Luick, secretary and treasurer. Mr. Sternberg was the founder of the Sternberg Motor Truck Co., which later changed its name to Sterling. The company will devote most of its energy until March 1 to the completion of its Government contracts and will then shift to peace business. It has sufficient business on its books to keep the plant operating at full capacity for an indefinite period. Nearly 500 are employed and none will be laid off in the near future, it is stated.

## MARKLE HEADS ONEIDA

Green Bay, Wis., Feb. 7—The Oneida Motor Truck Co., manufacturer of the Oneida commercial car, has increased its capital stock from \$300,000 to \$600,000 as the forerunner of a general expansion plan which will probably make necessary within a short time the erection of additions to the plant built and equipped about two and a half years ago. The company has reorganized its official personnel and at the annual meeting, Lafayette Markle, for several years president and general manager of the Republic Motor Truck Co., Alma, Mich., was elected president and general manager of the Oneida company.

## WILL MAKE 15,000 HUPPS

Detroit, Feb. 8—Hupp Motor Car Corp. will produce 15,000 cars in 1919. This is an increase of 5500 cars over last year. During the last half of January this company ran up its production to forty cars daily and further increase is contemplated. The company now has orders in hand for export and domestic trade in excess of 1200 cars.



## What Experts Say of Fuel Situation

THE questions "When will gasoline get better?" and "When will the price of fuel drop?" are of universal interest, especially now that the war is over.

Some do not see why the demand should continue so great. In this article is presented light on the subject for those who would find it. Dr. J. E. Pogue of the Bureau of Oil Conservation sums up the situation as follows:

1—The automotive industry cannot afford to ignore the fuel problem.

2—The supply will positively decline, and the price will rise without our being prepared for it.

3—The burden falls upon the engine. It must adapt itself to less volatile fuel and should be made to burn oil with less waste.

4—To accomplish these results is the task put before the automotive engineers who must study the petroleum, keep the industry informed and conduct researches with a view to averting an otherwise great calamity which would seriously disorganize an indispensable system of transportation.

Dr. E. W. Dean of the Bureau of Mines believes the supply of gasoline can be increased by improvements in refining, as:

1—A higher volatility limit for gasoline.

2—More efficient distillation methods.

3—Recovery of gasoline now lost in refining.

4—Wider use of cracking processes.

The Government has had four esti-

mates made of the oil resources of the United States. The latest places the oil available in the ground at the end of 1918 at 6,740,000,000 bbl. The total output of oil in the United States in 1917 was 335,315,601 bbl., and in 1918 probably 345,500,000 bbl. The total production from 1858 to date is estimated at 4,598,144,000 bbl. The present average gasoline extraction is at the rate of about 22 per cent.

In 1918 27,000,000 bbl. had to be taken from storage, and in addition 31,000,000 bbl. were imported from Mexico. The deficiency in current production during 1918 was, therefore, 58,000,000 bbl. A continuation of the consumption curve indicates for 1919 a consumption beyond the 400,000,000 mark. It was 397,000,000 in 1918.

# Fuel Demand Outstripping Supply

## Engines with Less Consumption and Further Refining as Solution

NEW YORK, Feb. 7—Better workmanship in manufacture and repair of motor car engines is the chief effect to be expected from the influence of airplane construction in motor car and parts factories. This opinion was expressed by three motor car engineers who have been building plane engines during the war, in a symposium on the effect of airplane engine design on motor car practice, at the two-day annual meeting of the Society of Automotive Engineers which ended here to-night.

An aviation engineer will head the society for the coming year. Charles M. Manly of the Curtiss Airplane & Motor Corp. was elected president, succeeding C. F. Kettering. B. B. Bachman, chief engineer of the Autocar Co., will be first vice-president. The second vice-presidents are: E. H. Belden, E. A. Sperry, T. B. Funk, John J. Armory and L. S. Kielholtz, representing respectively the motor car, aviation, tractor, marine and stationary engine fields. The treasurer is C. B. Whittelsey.

Membership in the society is increasing at the rate of 1000 a year. Jan. 1 the society had a membership of 3866.

### Airplane Influence on Car

The future of our fuel supplies, farm tractors, commercial possibilities of aircraft and the motorization of the army were discussed by the men who have been most closely in touch with these problems. The question "Will airplane construction influence automobile design?" received various answers, most of them negative. Henry M. Crane of Wright-Martin, Howard C. Marmon of Norkyke & Marmon, and O. E. Hunt of Packard, expressed opinions which agreed for the most part that the

lessons learned during the war in producing aircraft engines would not greatly influence motor car practice. Mr. Hunt pointed out that the system of control applied with success to war airplanes was entirely unsuited to motor car control.

Since the body of an airplane is its chief structural member, it has to be strong and light, and since it must be narrow it is not readily made comfortable. Even the airplane engine and the car engine were by no means identical. True, both should be light and compact but in many other respects they differed, because many things have to be sacrificed to adapt the airplane engine to its difficult task. This engine is necessarily built so light, that the cost of material and labor per horsepower are considerably greater than in the case of the motor car when weight is of less importance than first cost. To reduce weight aluminum is used extensively in airplane engines, and if the price of this metal declines sufficiently it will be applied more extensively in motor cars. Another means of saving weight is to use steel cylinders for airplane engines, but this construction is costly.

First cost has been largely overlooked in war airplane engine design where there was any military advantage to be gained by so doing. In motor cars the cost of materials must be watched carefully, and all parts must be built amply strong to withstand wear and tear on the road. A careful comparison of the two types of machines leads to the conclusion that the requirements differ widely. To secure the best possible results it will be necessary to study and develop each type by itself

and adapt each to its particular field. The manufacture of airplane engines however has brought about a higher grade of workmanship, which may well react favorably on motor car construction.

Grover C. Loening, an aeronautical engineer, undertook to answer the question as to how airplanes can be made use of in peace time. He stated that during the war so much valuable experience has been accumulated that there is no reason why airplanes should not be introduced more generally. Airplanes can be made attractive to business men, because they would be great time savers, especially in traveling distances exceeding about 60 miles.

### Flying Comforts Few

Mr. Loening does not think flying will become popular soon merely for the pleasure of flying, the comforts not being attractive as yet. The noise of the exhaust of the engine and of the propeller are rather disagreeable, flying is not healthy for weak nerves, long trips are tedious and uncomfortable, and the exhilaration expected is not realized. Exhaust, oil and cold rush of air are encountered, and the seating space available is very scant. For hauls up to 60 miles the motor car will continue to have the preference, because of its ability to stop at every curbstone. When it comes to longer distances the airplane has to compete with railroad train and boat. Since it is rather more expensive to use the airplane, it must offer sufficient inducement in the way of speed, to cut down the traveling time in going from office door to office door. So long as landing fields are quite distant from office buildings, an airplane trip usually would involve a motor

trip also. Hence the distance from city to city should occupy but little time for the trip.

To compete with train time, Mr. Loening figures, the airplane should be capable of developing a speed of 100 m.p.h., and if its speed is raised to 150 m.p.h., a complete trip in many cases will require but half as much time as when going by train. Thus, he says, a business man could leave his home in New York at 8 a. m., arriving in Washington, D. C., at 10:30, leave Washington at 2 p. m. and arrive at his office at 4:30. Evidently, the faster the airplane, the more attractive and valuable will it be in the eyes of the man whose time is worth considerable money.

Mr. Loening said a three-seated monoplane tested at Dayton, Ohio, recently made 150 m.p.h., and he saw no great difficulties in designing a three-seated plane with a 400-hp. engine that will travel up to 200 m.p.h. He believes people will be willing to put up with considerable inconvenience just as they do in the New York subway, for example, just to save time. Why then should not the business man be willing to suffer some inconvenience to save an hour or more on a day's trip? Thus, it is argued that speed is the factor which will make the airplane a real utility.

#### Declining Supply of Fuel

The consumption of all liquid fuel is proceeding at such a rate that an estimate can be made as to when the available supply taken from underground is likely to be exhausted. The conservation of the supply remaining, about 6,000,000,000 bbl. only, is perhaps the most important of all problems engaging the attention of the S. A. E. It devoted an entire session to discussion of the fuel question from every angle. This was arranged at the suggestion of Dr. Joseph E. Pogue of the Bureau of Oil Conservation, United States Fuel Administration, who presented a paper entitled "An Interpretation of the Fuel Problem."

In his paper Doctor Pogue pointed out how rapidly the demand for engine fuel has been increasing so that the demand shortly will exceed the available annual supply, although domestic production is about 340,000,000 bbl. and 60,000,000 bbl. are imported. He stated that about 20 per cent of the crude petroleum is being converted into gasoline. This percentage can be increased by employing more modern refining methods but not without increasing the price. The stock remaining naturally will become heavier all the time, and the yield of gasoline thus is bound to decline, so that finally not more than 2½ per cent can be reclaimed as gasoline. The blending of high-volatile gasoline made from natural gas with low-volatile refinery gasoline is employed widely, but the quantity made available by this method is relatively small. By lowering the volatility of the gasoline, through the use of a larger percentage of the volatile petroleum such as kerosene, the supply of engine fuel can be increased but not indefinitely or without disadvantages. The great objection to this plan is that existing types of engines are not adapted for burning this heavier oil.

The hope of obtaining adequate supplies from Mexico Doctor Pogue believes to be ill-founded, because the extent of supply

was an uncertain factor and the ships of Great Britain and the United States already are drawing heavily on Mexican oil. Moreover, the heavy Mexican crude had low gasoline content.

Substitute fuels, said Doctor Pogue, such as benzol, alcohol and shale-oil distillate, may be considered and may have to be adopted ultimately, but their price necessarily would be greater than that of gasoline to-day because of high manufacturing cost. The retail price would reach 50 or 60 cents a gallon.

The two possible, and perhaps temporary, solutions of the problem are the more intensive refining, or cracking, of the crude petroleum, with its necessarily greater cost per gallon, and the development of engines capable of utilizing fuel less volatile than gasoline. A third item that will help alleviate the situation is to build engines whose consumption is less than that of the average present-day engine but not without adding machinery, expense and complications. Doctor Pogue sums up the situation as follows:

1—The automotive industry cannot afford to ignore the fuel problem.

2—The supply will positively decline, and the price will rise without our being prepared for it.

3—The burden falls upon the engine. It must adapt itself to less volatile fuel and should be made to burn oil with less waste.

4—To accomplish these results is the task put before the automotive engineers who must study the petroleum, keep the industry informed and conduct researches with a view to averting an otherwise great calamity which would seriously disorganize an indispensable system of transportation.

That the S. A. E. is fully awake to the situation is shown by the fact that, in addition to Doctor Pogue, so many eminent authorities were brought together to discuss the various phases of the fuel problem. Dr. Davis White, chief geologist of the U. S. Geological Survey, contributed authoritative figures as to the unmined supply of petroleum in the United States. E. De Golyer spoke on Mexico as a source of petroleum. Dr. H. C. Dickinson of the National Bureau of Standards, who is in charge of research work pertaining to internal combustion engines, discussed the difficulties in the way of more rational utilization of liquid fuel in engines of existing types.

#### Improvements in Refining

One of the speakers at this fuel session was Dr. E. W. Dean of the Bureau of Mines. Doctor Dean discussed the possibilities of increasing the supply of gasoline by resorting to improvements in oil refinery practice. These possibilities include:

1—A higher volatility limit for gasoline.

2—More efficient distillation methods.

3—Recovery of gasoline now lost in refining.

4—Wider use of cracking processes.

Originally the end point of gasoline was 300 deg. Fahr. The high-test fuel is 350 deg. Fahr., while the usual grades are already so heavy that they have an end point of 400 to 450 deg. Fahr. Doctor Dean says if all the gasoline with this high end point were accepted, 15 to 20 per cent more gasoline would be available. Unfor-

tunately correspondingly less kerosene would be available.

The Bureau of Mines estimates that by improved distillation methods the nation's supply of gasoline might be increased by about 10 per cent. The refinery losses probably could be lowered from 4 per cent to 2 per cent of the crude oil refined, so that another 10 per cent of the gasoline produced would be gained.

The conclusions reached were that, excluding cracking, the refiner may be able to improve his gasoline extraction by 25 to 30 per cent while the cracking processes, if adopted, hold out a maximum yield of 100 per cent over the existing supply. It also is pointed out that the use of engines capable of utilizing both gasoline and kerosene would tend to prevent an excessive rise in the cost of liquid fuel, that is, in the cost of gasoline, etc.

To satisfy public interest, the Government has had four estimates made of the oil resources of the United States. As our knowledge of these resources increases it becomes possible to make these scientific guesses more accurate. The latest of these places the oil available in the ground at the end of 1918 at 6,740,000,000 bbl. The total output of oil in the United States in 1917 was 335,315,601 bbl., and in 1918 probably 345,500,000 bbl. The total production from 1858 to date is estimated at 4,598,144,000 bbl. The present average gasoline extraction is at the rate of about 22 per cent.

#### Taken from Storage

To supply our demand in 1918, 27,000,000 bbl. had to be taken from storage, and in addition 31,000,000 bbl. were imported from Mexico. The deficiency in current production during 1918 was therefore 58,000,000 bbl. A continuation of the consumption curve indicates for 1919 a consumption beyond the 400,000,000 mark. It was 397,000,000 in 1918.

Doctor White fears that Mexico has less oil under ground than the United States, but he holds on the hope that processes may be developed which will permit of extracting oil on a commercial and economical scale from the great deposits of shale which exist in Colorado, Utah, Wyoming and Nevada.

Of fuels in sight for motor vehicles we have only petroleum products, alcohol, benzol and possibly shale oil distillates. But before all these can be used successfully, it is necessary to adapt our engines to handle them properly. Again, we must look to redesigning engines to handle present fuels.

The brake thermal efficiency of motor car engines running under average load conditions is 10 per cent or less. In other words, 90 per cent of the heat of the fuel now goes to waste. Some of this loss is due to operating with a 25 to 50 per cent richer mixture than is necessary. With better carburetion it probably would be possible to run an additional 1,000,000 cars without increasing the present total gasoline consumption.

After enumerating the various causes for the present lack of efficiency in the use of fuel Doctor Dickinson pointed out that if automotive engineers can succeed in reducing all these losses by half the effect will be equivalent to doubling our present fuel supply.



Edward R. Hewitt, consulting engineer of the International Motor Co., discussed the question of size and capacity of farm tractors. He has been active in this field for over twelve years and acquired very valuable information from personal observation on a number of tractor-type machines.

Mr. Hewitt systematically determined the power required to move a tractor over different kinds of soil. He discovered that the drawbar pull on sandy ground is equal to 30 per cent of the weight of the tractor, or at best 43 per cent on damp sandy ground. He found this could be improved somewhat by the use of cleats riveted to the faces of the driving wheels. If the creeper-type tractor were not so expensive in maintenance, he said, it would be more advantageous than that having smooth wheels with cleats. He advocates large machines rather than small ones as either size requires one man for operation, which represents a third the total cost, while the cost of maintenance and repairs is little greater, so the cost of operation, owing to the greater capacity of the big machine, is cheaper per acre of ground plowed. He favors building as large machines as can be controlled by one driver, but not wider than 9 ft. over all, to pass gateways and bridges, and with a total operating weight of 14,000 to 16,000 lb.

With this weight he figures that an eight-plow tractor readily could plow 2.8 acres an hour, while a two-plow machine could do but 0.7 acre an hour. He believes it will ultimately be possible with a well designed and constructed tractor to lower the total cost of plowing to about 60 cents an acre as against \$3 to \$5.50 with horses. Such a reduction would have a material effect on the food problem.

## 1200 at Dinner

NEW YORK, Feb. 7—That extension of good roads is the only limiting factor in the sale of motor cars and trucks was brought out last night by Alfred Reeves, general manager of the National Auto-

bile Chamber of Commerce. Mr. Reeves' remark came in a speech before the Society of Automotive Engineers at its Victory dinner at the Astor, which followed by a Midnight Frolic at the Century was the windup of the two-day annual meeting of the society. Mr. Reeves, in discussing the future of the motor car, told that the industry well has been recognized as a most vital and important one—chiefly utilitarian. The future car, he foresaw, is one with a disappearing top and spare tires and other improvements that have been demanded by the public.

The dinner was attended by more than 1200 members and guests of the society. Speakers included C. F. Kettering, president; Alfred Reeves; Charles M. Manly, president-elect; John N. Willys, and George F. Houston, of Wright-Martin. Job E. Hedges was toastmaster.

Discussing aeronautics, George F. Houston briefly expressed a problem that is probably of as great importance as any at this time to the automotive industry—that of the present and future of aviation. The past, he declared, referring to the war, was a testimonial to the engineering and productive skill of the American automotive industry, the present—"the less said the better"—but the future, he was certain, ultimately will find the airplane and the airship firmly established and accepted in an important niche in the commercial world.

Capital must recognize its obligations to labor, and labor in turn must recognize its debt to capital, said John N. Willys, who told of his plan to divide the profits of his various companies with the workers "above a just and reasonable wage compensation." The Ford plan he said not only provided the workers with greater remuneration but increased their incentive and consequently their productive output and he stated frankly, if the clock could be turned back, he would have followed the Ford plan in less than 24 hr. after its inauguration.

Others at the speaker's table included: H. R. Sutphen, president of the National

Association of Engine & Boat Manufacturers; F. H. Russell, president of the Aircraft Manufacturers' Association; Camillo Cerruti, chief Italian military mission; C. W. Stiger; Capt. E. C. Hugh, and Capt. George Sykes, British war mission; C. E. Thompson, president Motor & Accessory Manufacturers' Association, and Col. A. C. Seaman, Motor Transport Corps.

## STATE TO REVISE LAWS

Los Angeles, Cal., Feb. 7—Representatives of every branch of the industry, state, county and municipal governments gathered here in convention and framed revisions for the state motor vehicle law. A committee was appointed to draft the bill and see that it is enacted by the state legislature this month. The committee is composed of David Faries, Automobile Club of Southern California; David Smith, Los Angeles Motor Car Dealers' Association; and John W. Stetson, California State Automobile Association.

The committee on registration and administration recommends annual renewal of license plates instead of renewing only the seal as at present, the number to go with the car and remain with it as long as it is in service. An ownership transfer fee of \$1 would be paid by the purchaser, and there would be no registration of second-hand cars by dealers, no refunds and no reregistration of cars.

Standardized laws governing speeds in all cities are advised. A distinct change in the speed laws was proposed by the recommendation that a speed of 40 m.p.h. be allowed on open country roads where there are no blind crossings or other vehicles within 400 ft. of the car. A 20-mile speed on wet, improved streets and a 10-mile limit at railroad crossings where the view is obscured and 15-mile limit where the view is clear were recommended. No cut-outs are to be allowed open at any time or place.

Full arm signal when turning to right or left will be compulsory, and in cases where closed windows or other structural features make this impossible, mechanical devices answering the same purpose must be used.

All trailers carrying a load of more than 1 ton must be equipped with brakes.

To stop joyriding it is proposed to make operation of a car without the owner's consent a felony, whereas under the present law it may be a felony or misdemeanor. Operation of a motor vehicle when under the influence of liquor also is to be a felony.

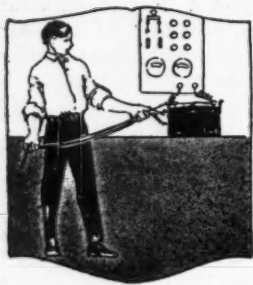
It is recommended that the age of chauffeurs of motor cars for hire shall be twenty-one years' minimum instead of eighteen years.

## NAVAL AIRCRAFT PRODUCTION

Washington, Feb. 7—The United States naval aircraft factory at Philadelphia produced aircraft valued at \$5,435,000 up to the time the armistice was signed. It had completed ready for shipment 183 twin-engine flying boats at an average cost of \$25,000. It had also produced four experimental Liberty engine seaplanes carrying the Davis non-recoil gun, at a cost of \$40,000 each, and fifty sets of twin-engine flying boat spare parts worth \$10,000 a set. In addition considerable minor experimental work and overhauling of machines from other stations was done.

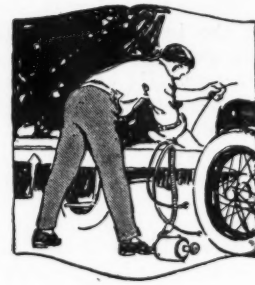


This shows French women in the service of the American army assembling light motor cars at a salvage plant in an American base port overseas



# Electrical Equipment of the Motor Car

*By David Penn Moreton & Darwin S. Hatch.*



*Editor's Note—Herewith is presented the 133d installment of a weekly series of articles begun in MOTOR AGE, issue of June 29, 1916, designed to give the repairman and motorist the knowledge which will enable them to care for and repair any and all of the electrical features of the car, no matter what make or model it may be.*

*The first half of this series has been published in book form by the U. P. C. Book Co., Inc., 243-249 West Thirty-ninth street, New York, and is sold at \$2.50. The remainder of the series will be published as a supplementary volume.*

## Part CXXXIII—Bijur Electrical Systems

**T**HE Bijur system on the Jeffery Chesterfield six is a three-unit, two-wire—except for the headlights—6 volt installation and a complete wiring diagram is given in Fig. 677. The output of the generator is regulated by a constant-voltage regulator, and the current delivered by the generator when it is connected to the storage battery will depend on the condition of charge of the battery. The lower the charge in the battery, the lower its voltage and, hence, the greater the difference between the voltage of the generator and the voltage of the battery, which results in a larger current being produced than when the battery is nearer full charge and its voltage near equal in value to the voltage of the generator. The automatic voltage regulator and electromagnetic cutout are housed in an aluminum box on top of the generator. A special reversing plug is provided, by which the generator may be disconnected or the connections to the generator reversed.

Depressing the starting pedal connects the starting motor to the engine by causing a pinion on the square motor shaft to mesh with a gear on the flywheel of the engine and also closes the starting motor switch.

The out-of-focus lamps are wired to use the frame of the car as one side of the circuit. The dashlight is on the taillight circuit and so arranged that these two lamps are always in operation

when any combination of the car's headlights is in operation.

The body and chassis wiring are separate but connected through terminal posts and fuse block located on the engine side of the dash, which permits bodies being changed without the necessity of rewiring.

All the lamp circuits are provided with separate fuses. A fuse is located in the ground circuit between the magneto tap and the lighting switch, and this fuse will blow if an accidental ground is made on either side of the system. The blowing of this fuse when the lighting switch is in the "off" position, shows that the accidental ground causing this fuse to blow is on the positive side of the system. The blowing of this fuse when the lighting switch is in the "all bright" position or the "out of focus bright" position, shows that the accidental ground causing the fuse to blow is on the negative side of the system.

The ignition is taken care of by a magneto controlled by a magneto switch.

### Bijur on the Scripps-Booth

The Bijur installation on the Scripps-Booth light cars is a single-unit, single-wire, 12-volt system with the positive side of the battery grounded. A complete wiring diagram of the system, as used on the first 1,100 cars, is shown in Fig. 678. The elec-

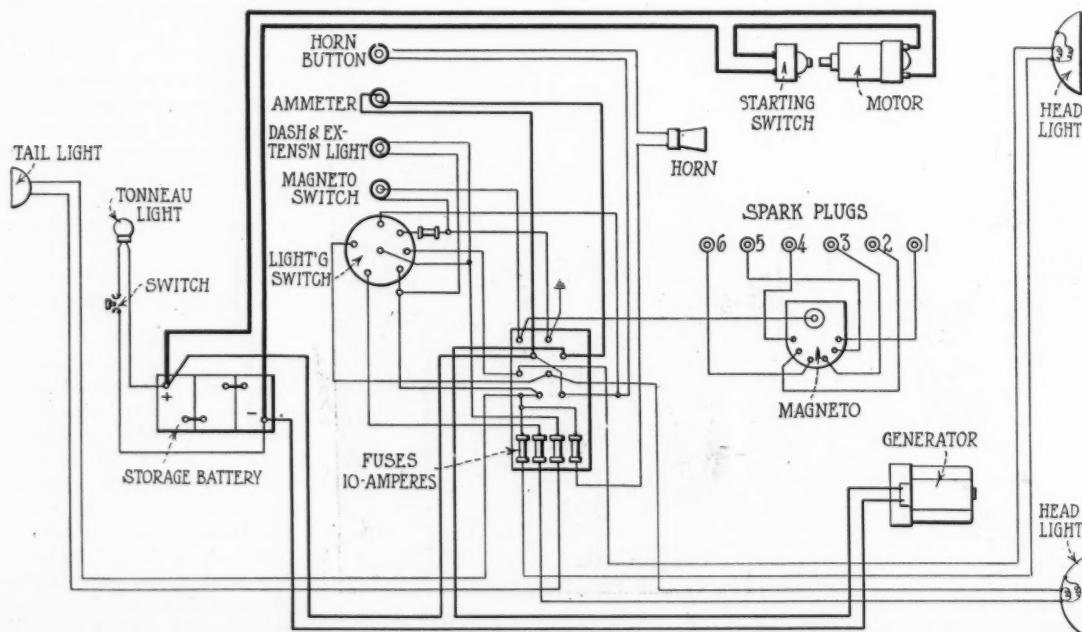


Fig. 677—Wiring diagram of Bijur installation on the Jeffery Chesterfield six



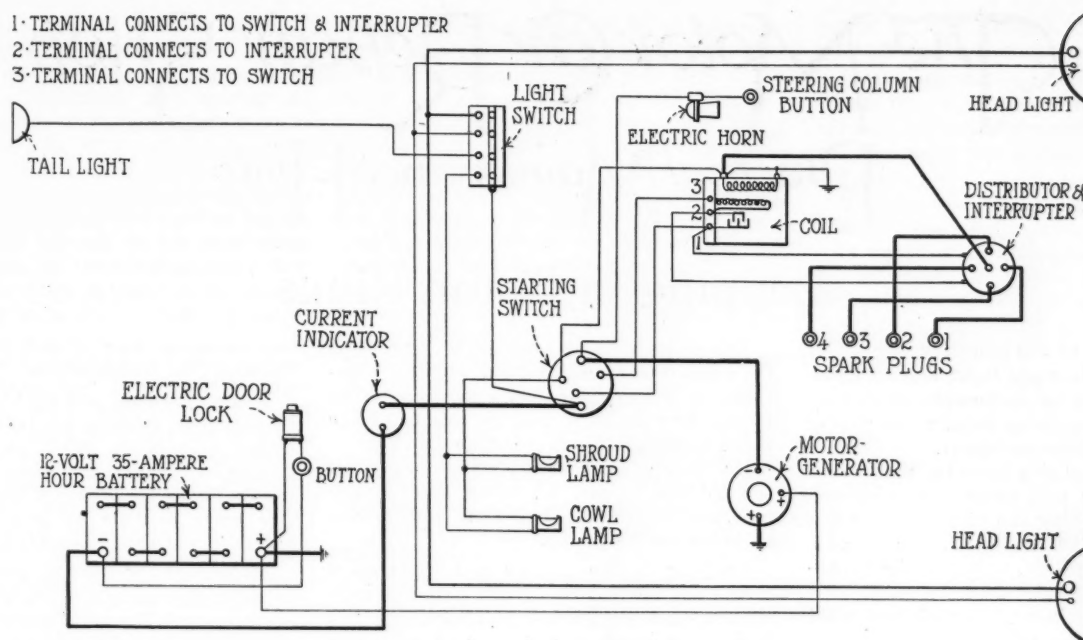


Fig. 678—Wiring diagram of Bijur installation on the first 1100 Scripps-Booth cars

trical unit is chain-driven from the crankshaft of the engine and is, therefore, in operation whenever the engine is running. The output of the electrical unit when operating as a generator is regulated by a combination of the third-brush and reversed-series field methods.

A switch on the dash controls the ignition and starting circuits. When this switch is in the "off" position the ignition circuit is open and the electrical unit is disconnected from the storage battery. When this switch is thrown to the "on" position the ignition circuit is closed and the electrical unit is connected to the storage battery. The electrical unit will draw current from the storage battery and act as a motor until the engine starts to run under its own power and drive the electrical unit, which will change to a generator when the voltage generated in its armature is greater than the voltage of the storage battery.

Beginning with car 1,101 a three-position switch is used instead of a two-position switch. A wiring diagram of this system is shown in Fig. 679. With the switch in the "off" position the

ignition circuit is opened, the electrical unit is disconnected from the battery and the field circuit of the electrical unit is open. When the switch is in the "on" position all these circuits are closed, and this corresponds to the normal operating position. When the switch is in a third-position between the "on" and "off" positions and marked "idle" the ignition circuit is closed and the electrical unit is disconnected from the battery and its field circuit is open. With the switch in the "idle" position the storage battery neither charges nor discharges. The switch should be turned to the "idle" position when the car is standing with the engine running slowly, or when driving very slowly as in congested city traffic. A current indicator on the dash shows whether the battery is "floating," "charging" or "discharging." A four-gang lighting switch located on the dash controls all the lighting circuits.

A battery ignition system is used. The internal connections are plainly shown in Figs. 678 and 679.

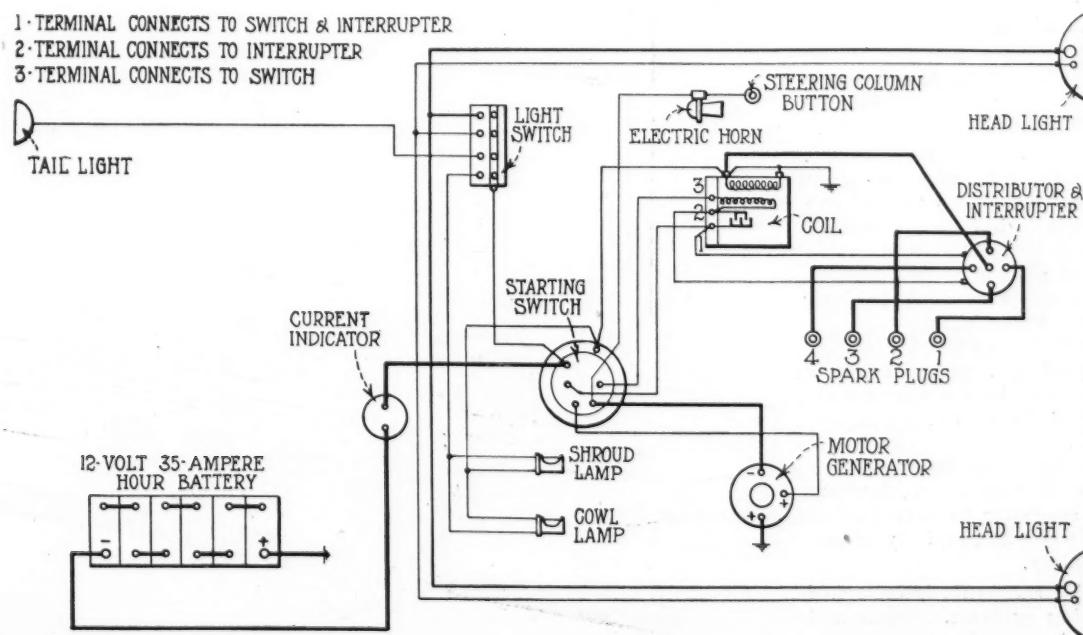


Fig. 679—Wiring diagram of Bijur installation on the Scripps-Booth, beginning with the 1101st car

# The Motor Car Repair Shop

## Practical Maintenance Hints

### Lapping in Piston Rings

**T**HE function of the piston in a cylinder is to provide a gas-tight movable partition in the cylinder so that the gases may expand and in so doing impart the energy of the gases to the crankshaft.

As a mechanical side issue the piston also acts as a piston and crosshead combined, the upper part being the piston proper and the lower part the crosshead, or guide.

As it is not feasible, owing to the expansion of the piston by heat to make it a tight fit in the cylinder, this tightness must be obtained in some other way.

The most usual method is by fitting rings in grooves in the upper part of the piston, which rings are normally of larger diameter than the cylinder but when sprung into the cylinder are supposed to fit it perfectly and make a gas-tight joint between the ring and the cylinder and also between the rings and the piston.

If the workmanship is perfect, the joint, although movable, will be gas-tight, but unfortunately there is no such thing as perfect workmanship, so that all commercial engines leak more or less gas past the pistons and rings.

In the commercial manufacture of engines we strive to obtain a round and straight cylinder and rings that fit the grooves and that are round and of the same diameter as the cylinder bore when they are sprung into the cylinder.

However, as no machining operations are perfect and it is impossible to work to absolutely exact sizes we make the parts as close to the exact sizes as commercial considerations will permit.

#### Cylinders Not Quite Round

This means that every cylinder is not quite round, that the hole is not quite straight, that the rings do not quite fit in the slightly elliptical bore and do not quite fit the piston grooves.

It is true that the differences are very slight, possibly not more than half of one thousandth of an inch, but even this small amount is sufficient to allow an appreciable amount of hot gas acting under 300 lb. or more pressure per square inch to leak through and cause a loss of power.

Now there is a way of making these rings fit practically perfectly, and the reason that it is not practiced by the engine makers is on account of the labor cost and time it takes to do it.

The process is known as lapping. This process is used on all very fine work where it is absolutely necessary to have perfect fits and where expense and rapidity of production are secondary.

All the finest instruments have lapped joints and working surfaces. Gages and precision measuring tools always are lapped.

The most familiar example of lapping is the so-called valve grinding, which is practiced on all engines, because there is no better way to do it and by reason of the small surfaces it can be done quickly.

On racing cars the pistons and rings usually are lapped in, often after every race, and it is surprising what a difference it makes in the power.

Lapping in the pistons and rings on a single engine that is in fairly good condition to start with is not a difficult job, but it will take one or two days to get them right.

One of the first things that you will be told by the wise ones to whom you mention the fact that you propose to lap in your rings with emery is that the emery will stay there for years, causing excessive wear, and then very soon you will have to get a new cylinder block, etc.

This is pure "bunk" and is on a par with carrying a horse chestnut in your pocket to ward off rheumatism.

In the first place all the emery can be washed out and, secondly, if a little of it was left in, it soon would wear out and cause no trouble.

When grinding valves some of the grinding material often gets into the cylinders,

but we never hear of new cylinders being necessary in consequence.

When cylinders are ground in finishing, as they are usually, we never hear of the emery embedding itself in the iron, although in this case the conditions are more favorable to such action than in lapping. The same is true of ground crankshaft bearings, camshaft bearings, etc.

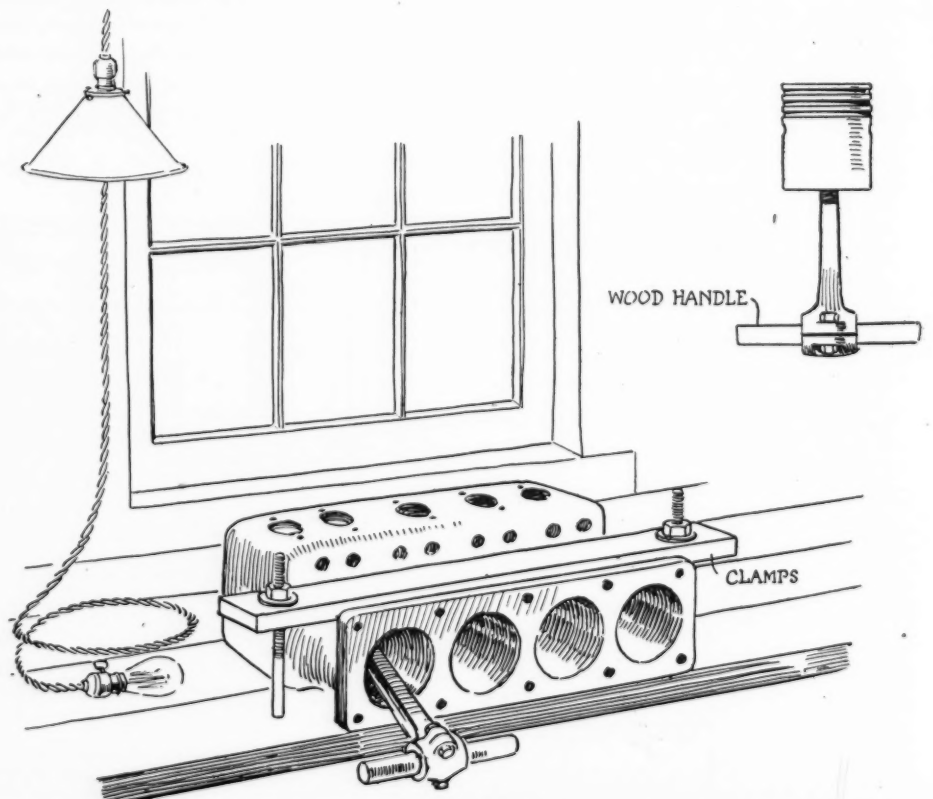
To prepare for lapping, the engine should be taken down and thoroughly cleaned with kerosene and the parts marked so that the pistons and connecting rods will be lapped and reassembled in the same cylinders and in the same position as they were originally.

#### Solid Bench Needed

A good solid bench provided with heavy wood clamping arrangements to hold the cylinder block firmly is also necessary.

A round piece of wood about a foot long and of a diameter that will clamp firmly in the big end of the connecting rods should be provided as a handle.

If the piston pin is fixed in the piston, it will be necessary only to plug the ends of the pin with waste to keep the emery from working into the connecting rod small end bearing.



Apparatus for lapping in piston rings on an engine with emery, including the wooden handle advocated



If the piston pin is fastened in the connecting rod small end and works in the piston, some method must be employed to exclude the emery from the bearing as these bearings are non-adjustable. A tight fitting cork is best if it can be inserted.

With the cylinder block clamped on the bench so that the lower ends of the cylinders face the operator, the wooden handle clamped in the big end of the connecting rod, the piston pin bearing properly protected and the rings in place on the piston, we are ready to begin the lapping operation.

It is assumed that the cylinders are not scored and that any broken rings have been replaced, or, if any of the patented rings are to be used that they are in place.

Half a pound of No. 100 emery or similar abrasive, 5 gal. of a mixture of 4 gal. of kerosene and 1 gal. of machine oil, and 2 oz. of the finest tripoli should be provided.

Take about a quart of the kerosene mixture and stir the emery in it, making a very thin paste, which should be spread on the bore of the cylinders and the pistons and rings.

This mixture will have to be stirred before each application as the emery will settle to the bottom of the can.

The best results will be obtained from many thin applications rather than a few thick ones.

#### Work Piston in Cylinder

Then insert the piston in the cylinder in the position in which it will be when re-assembled, and with the wooden handle work the piston back and forth in the cylinder, at the same time giving it a rocking or revolving motion with the handle about 30 deg. each side of the parallel position of the handle.

After about 100 strokes the piston should be removed and wiped off with the clean kerosene mixture and the cylinder bore treated similarly. Now observe the condition of the rings and the bore.

It generally will be found that the rings will show spots of varying length that are different in color from the parts which have been ground by the emery. If these are very large, that is, an inch or more in length, it will take too much lapping to reduce them and a new ring should be fitted. Similarly, if the cylinder bore shows untouched spots of more than 1 sq. in. in area on the portion over which the rings would travel in the regular operation of the engine, the cylinder should be re-ground in a cylinder-grinding machine. If

in this case more than 0.002 in. on each side have to be taken off to true it up, then oversize pistons and rings will have to be fitted.

These latter contingencies are not likely to occur but are mentioned so that time will not be wasted.

Now repeat the lapping operations until all the rings show an even color all over and the cylinder bore on the working portion shows that the rings touch all the way around and the full length.

This may take a half a day or it may take two days to get them right, but it is time well spent and will not have to be done again.

The rings may be lapped in the grooves by grasping them in the hand with sufficient pressure to close the slot and then revolving them in the groove. A few minutes should suffice for each ring.

After the lapping is finished on all the cylinders they should be washed out carefully with clean kerosene mixture until all traces of the emery is removed.

The pistons and rings are washed by immersing them in the mixture and at the same time working the rings around with the hand.

Now mix the tripoli in about a pint of the kerosene mixture and go through five or six lapping operations and then wash as before and the job is finished.

When assembling the pistons in the cylinders smear the pistons, rings and the cylinder bore with fresh clean cylinder oil in which has been mixed Oildag in the proportion of one No. 1 can to a quart of oil, being sure to get it well behind the rings and in the piston pin bearing.

You will now have cylinders that are really gas-tight and they will stay so. The



How drill with offset center can make hole larger than itself

power will be increased, the consumption of oil reduced and smoking eliminated.

In the lapping operation care should be taken that the upper ring does not come through the top of the cylinder and prevent the return of the piston as well as injure the ring.

This can be prevented by putting a wood block of the right thickness in the combustion chamber in closed-head cylinders and by arranging a stop on the bench in the case of loose-head cylinders.

On the "in" stroke the upper ring should project out of the bore about  $\frac{1}{8}$  in., and on the "out" stroke about  $\frac{1}{2}$  in. past the lower working surface, the working surface being that part of the cylinder wall over which the rings travel.

There is just one thing to be borne in mind on this work and that is that lapping cannot be hurried. There are only two kinds of lapped surfaces—first class and rotten. There are also only two kinds of valves—those that leak and those that do not.

After you have lapped your rings to a fit do not take them off, as it will get them out of shape. If you doubt this, try it.

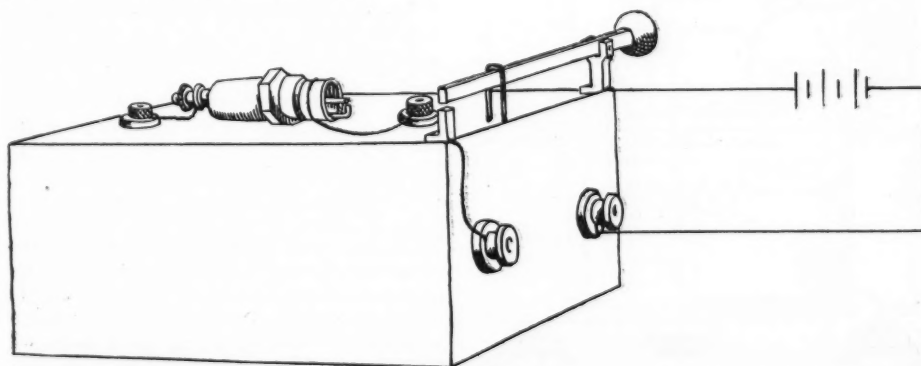
## To Drill Larger Hole

It sometimes happens that the service station or the garage repair departments are hard pressed for a method to drill a hole slightly larger than the one drill which is just a bit too small to meet requirements. Within reasonable limits the following method will serve satisfactorily to overcome the obstacle: Suppose it is desired to drill a  $\frac{3}{8}$  in. hole and the only available drill is  $\frac{1}{4}$  in. in diameter. As can be seen in the exaggerated sketch, the drill is ground with the center of its conical point  $\frac{3}{4}$  in. away from the center, in other words the center is offset. With careful use of this drill a hole can now be ground which will have a diameter of  $\frac{3}{8}$  in. This method can not be carried to the extreme as the flutes on the drill will not be able to cut the material if the eccentricity is too great.

## Automatic Torch Lighter

An automatic arrangement for lighting an acetylene torch electrically consists of an old-fashioned single-unit vibrator coil, a spark plug, dry cells and automatic switch. The spark plug is laid on the coil box with its terminal connected to one of the high-tension terminals on the coil and the other high-tension terminal on the coil grounded on the shell of the plug. To light the torch it is simply necessary to rest it on the switch arc, which closes under the weight of the torch, thus producing a spark at the plug points which lights the flame. One side of the dry cells is connected to one of the low-tension terminals on the coil, but the other side of the cells runs to the base of the switch.

As is clearly shown, there is a weight on the short end of the switch arm which causes it to remain open except when the torch is resting on it. Closing the switch allows the current to complete the circuit through the other terminal of the coil.



Apparatus for lighting an acetylene torch electrically with an old-fashioned single-unit vibrator coil, a spark plug, dry cells and switch

# The Readers' Clearing House

## Questions and Answers

Conducted by B. M. Ikert

### Wants Bender Special Information

Q—Give the address of the company making the new Bender Special car.—Charles Richardson, Ellsworth, Ill.

1—The Bender Special was made in Chicago. Tom Alley was to drive one of their cars but for some reason did not do so. The company is now out of business.

### Trouble with Oil Pump

Q—What makes the plunger oil pump on a Paige Glendale equipped with a Rutenber engine have that decided tap, tap, tap? At the same time it does this the oil gage on the dash will fluctuate from 0 to 3. It sounds like a very loose pushrod.—Earl Harrison, Muskegon, Mich.

Your oil pump is dirty. Plunger pumps very easily become noisy when even the slightest amount of sediment collects on the upper end of the plunger. This causes the plunger to stick and does not follow up the cam which drives it. This causes the cam to have a striking effect, and noise is the result.

### Calculation of Tractive Effort

Q—Publish formula for calculation of tractive effort.—W. T. Bissell, Danville, Ill.

Engine horsepower as listed in the specification tables are all calculated from an assumed piston speed of 1000 ft. per minute. If one car is listed as having a horsepower of 29.4 and another of 19.6, it means that the first mentioned car is more powerful than the other. The designer in calculating the gear ratio and wheel diameter bases his estimate on the performance of the engine. If the maximum power of the engine is obtained at a speed of 2200 r.p.m. and the maximum car speed desired is 55 m.p.h., then the gear ratio and wheel di-

### Miscellaneous

ameter are calculated to meet these two requirements. It, therefore, seems natural to expect that one car having a high-powered engine will be able either to accelerate faster or travel faster than one of lower power.

Tractive efforts, if calculated and shown for each car in the tables, would probably cause more confusion than they would be worth. So many conditions must be assumed in making these calculations, some of them representing the ideal, that the value becomes small and the results incorrect. However, the following is a formula that will give the tractive effort with as near an approach to the truth as might be expected:

$$\text{Tractive effort in pound} = \frac{8.5 \times D^2 \times S \times G. R. \times N}{\text{wheel diameter in inches}}$$

in which D = cylinder diameter in inches

S = piston stroke in inches

G. R. = gear ratio

N = number of cylinders

### Building Juvenile Car

Q—I am building a juvenile car similar to Brent Harding's. Could I use the same gear ratio as was in the motorcycle whose engine is now in the car? Should I use a jackshaft and should the final drive be one or two chains? Can the hub of a motorcycle wheel be made to fit a Ford steering spindle? How? About what would be the speed of such a car?—Edwin Grant, Carlisle, Iowa.

It is a much better plan to design the car from the bottom up. Write to the manufacturer of the engine and get a speed

power curve, or if you have the facilities, obtain the data for the curve yourself. Suppose that the maximum power is obtained at an engine speed of 2200 r.p.m. Then you want to obtain a speed of, say, 65 m.p.h., which is equivalent to 5720 f.p.m. If you use the regular 28-in. motorcycle wheel, the wheel speed will be 780 r.p.m. at 65 m.p.h. The gear ratio then will have to be 2200 divided by 780, or 2.82 to 1. The small machines of this type so popular in California use a jackshaft and one chain to one rear wheel only, the tires being changed at intervals to equalize the wear. A special spindle will have to be made as the Ford spindle will not fit the regular motorcycle wheel.

### Concerning Rear Axles

Q—Explain the difference between full floating and semi-floating rear axles.

2—Give reasons why some manufacturers claim semi-floating are better and why?—J. A. Hill, Adairville, Ky.

1—A floating axle bears no weight of the car. Its purpose is to drive the car only, and a twisting strain is the only strain that the floating axle is subjected to. A semi-floating bears the twisting strain in addition to a partial weight of the car.

2—A semi-floating rear axle is probably somewhat better for a light or medium weight car, but as soon as the weight increases over about 3000 lb. it becomes advisable to build a floating axle.

### General Car Questions

Q—My 1918 Ford that has been driven 10,000 miles uses too much oil, none of which gets past the pistons. It seems to leak around the case. Can this be overcome at a small expense?

2—There is also a slight sharp knock that can be heard when driving about 20 m.p.h. Where can the trouble lie?

3—My mail route is 27 1/4 miles, and I make about seventy stops per day. I average about 12 m.p.g. of gasoline and about 25 m.p.g. of oil. Should I not receive better mileage from both?

4—Do you know of a car that could be run at less expense than a Ford? How about a Buick 35 or a Hupmobile 32?

5—I use Goodyear fabric tires. Would I get enough extra mileage from a set of Goodyear cord tires to make up for the difference in the price?

6—When I jack up the rear wheels of my Buick D45 and turn same I find quite a bit of play. How can this be remedied?

7—What care should be given the clutch in a Buick D45?

8—Can a book be obtained explaining the Buick D45 and showing how to make all adjustments?

9—What is a good test for a broken piston ring?

10—Do you know of a carbon remover that can be put in the gasoline that will keep the engine free from carbon and at the same time not injure the engine?—Ashton V. Renwick, Harrisonville, Mo.

1—If there is an oil leak around the crankcase seam of your Ford it can be remedied by making a gasket of heavy, hard-surfaced wrapping paper. When fitting this paper gasket be sure that the paper has no wrinkles or creases in it, as it then will leak as badly as ever.

2—If this knock occurs when the engine is running along without a heavy pull and

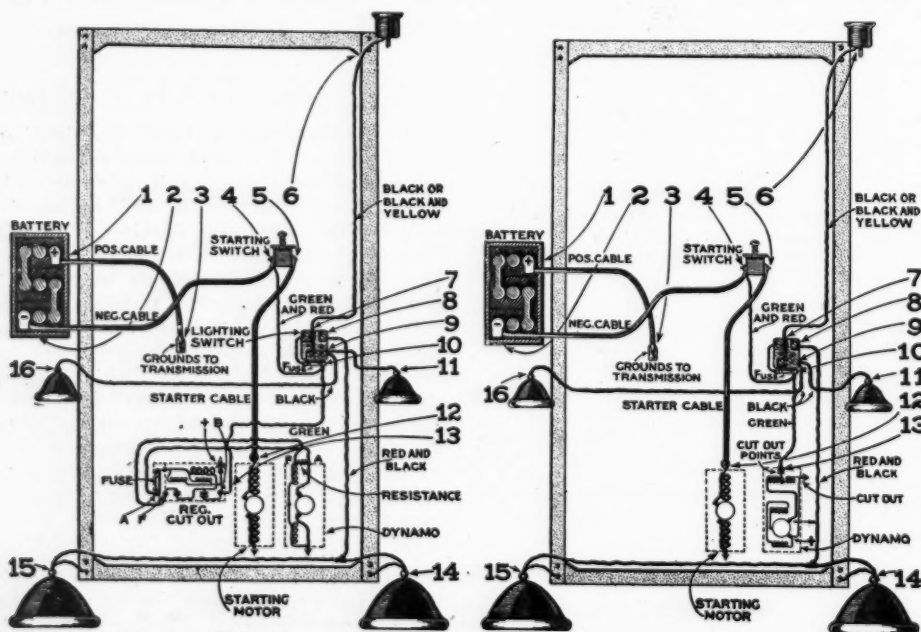


Fig. 1—Gray & Davis starting and lighting systems for Fords with regulator cut-out, left, and third-brush regulation, right



is a light metallic sound, it is probably a loose connecting rod bearing or a wristpin bearing. The cylinder can be determined by allowing the engine to run idle at the speed that the knock occurs, and then depressing the contacts on the ignition coils one at a time and listening for the ceasing of the knock.

3—You travel  $27\frac{1}{2}$  miles a day, and make seventy stops during that time. This is an average of 0.393 miles at a time or about two blocks. You probably allow your engine to idle while collecting the mail from the box, and still your car is making 12 m.p.g. It will be very difficult to find a car that will make a better average than this. In our estimation you are doing exceedingly well. It is well to bear in mind the fact that mileage records generally are made when long trips are made without stopping.

5—You will get extra mileage from cords but not enough to compensate for the increased cost. Cord tires reduce road friction a lot, but in your case this would not be any advantage because of the frequent stops.

6—There are two kinds of play in the rear wheels, sideways produced by loose bearings and peripheral play produced by wear in the universals, the differential and the transmission. It is assumed that your trouble is of the former kind, and if so, it can be remedied only by replacing the ball bearings in the axle. The axle on the D45 is of the floating type and is equipped with ball bearings. These bearings do not run on a tapered shaft and hence cannot be taken up but must be replaced.

7—The leather in the clutch should be treated once in a while with a little neat-foot oil. This keeps the leather from becoming stiff and will eliminate the tendency to grab. If the clutch starts to slip while going through a hard pull, it is an indication that the leather is too oily or else it is worn. In the first case the leather should be washed with gasoline and a little finely-ground Fuller's Earth applied. In the second case the spring-loaded adjusting nuts will have to be taken up slightly, the three of them being turned an equal amount. This is very important.

8—Buick can supply you with an instruction book for the D45.

9—The best test for a broken piston ring is to examine the spark plugs. If regular examination is carried on and the plugs ordinarily appear dry and then some fine day are plugged up with oil, it is pretty certain a piston ring has let go. A tinkling sound sometimes is given off when the rings let go, but it is very hard to hear.

10—There is no satisfactory carbon remover that can be put in with the fuel. Many attempts have been made to make such a carbon remover, but success has not yet awarded the efforts.

## The Electric System

### General Battery Questions

Q—Which post on any storage battery should be grounded, positive or negative?

2—Which is positive when a battery is marked thus — and +?

3—How can a generator on a car be tested so as to ascertain whether it is charging or not?

4—Which is stronger, six dry cells or six wet storage batteries, and why?

5—How can I connect dry cells to a magneto when the same is weak?—J. A. Hill, Adairville, Ky.

To assist readers in obtaining as a unit all information contained in this department on a certain subject MOTOR AGE segregates inquiries into divisions of allied nature. Questions pertaining to engines are answered under that head, and so on.

### MISCELLANEOUS

Charles Richardson.....Ellsworth, Ill.  
Earl Harrison.....Muskegon, Mich.  
W. T. Bissell.....Danville, Ill.  
Edwin Grant.....Carlisle, Iowa  
J. A. Hill.....Adairville, Ky.  
A. T. Renwick.....Harrisonville, Mo.

### THE ELECTRIC SYSTEM

J. A. Hill.....Adairville, Ky.  
M. H. Maloney.....Hinton, W. Va.  
G. S. Van Houghton.....Chicago  
J. E. Schwendeman.....Harvey, Ill.  
Oliver Sveen.....Lake Mills, Iowa  
J. D. Sampson.....Thomasville, Ga.  
Oscar A. Kichner.....Leroy, Ill.  
Morris Ferguson.....Salt Lake City, Utah  
Harry Duncan.....Fresno, Cal.  
B. M. Sain.....Pittsburgh, Pa.  
C. G. Wallace.....Taylor, Ariz.  
G. L. ....Farrell, Pa.  
August Green.....Kramer, N. D.  
A. M. Mann.....Webster City, Iowa  
George W. Lutes.....Cairo, Ill.

### ENGINES

Preston Moody.....Fort Benton, Mont.  
H. C. Brown.....Wheeler, W. Va.  
H. V. Price.....York, Neb.  
Earl Harrison.....Muskegon, Mich.

### REBUILDING

B. F. Milton.....Denton, Tex.  
Noel E. Bullock.....Madrid, Neb.  
C. W. Harter, Jr.....Hobart, Okla.  
U. L. Jones.....Kelly Field, Tex.  
R. A. Yoost.....Clark, S. D.  
Roy M. Martin.....Keokuk, Iowa

No communication without the writer's name and address will be answered in these columns.

1—This cannot be answered until we know the make of the car. Some cars have the positive grounded and some have the negative grounded.

2—The minus sign, —, is the accepted indication for negative, and the plus sign, +, is the positive side of the battery.

3—By making a break in one of the generator lines and inserting in the break an ammeter.

4—This is a peculiar question. Six dry cells will give the same voltage as six cells of a storage battery very nearly. But there is a big difference between the capacities of these two sets. The dry cells if connected in series will have a capacity of about 30 amp., while the storage battery may be given a current up to thousands of amperes, depending on the area of the plates. These currents are on a direct

short-circuit. There are many reasons why the storage cell, or accumulator, as it is more properly called, has a higher capacity than the ordinary dry battery. One reason is that the internal resistance of the dry battery is very much higher than that of the storage cell, the dry cell being about 0.08 ohms and the storage cell about 0.001 ohms. Suppose that each of these batteries be connected up on direct short-circuit and that the e.m.f. of each cell is 2 volts. Since this is a direct short-circuit, there is no external resistance and the total current produced is dependent upon the internal resistance of the cell. Then 2 divided by 0.08 gives 25, which is the current the dry cell will give and the storage cell will be 2 divided by 0.001, or 2000 amp.

5—A magneto cannot be operated or made stronger by connecting into the line a series of batteries. A separate wiring with a coil and a switch for throwing the engine over from battery ignition to magneto ignition is needed.

### Ammeter on 1914 Buick

Q—Instruct how to put an ammeter on a Buick B 37 1914 model.—M. H. Maloney, Hinton, W. Va.

Referring to the sketch of the generator in Fig. 8, the strap connects the terminals 1 and 2. On some of the generators the strap is on the inside, and if that is the case, the motor-generator must be removed from the car, and be dissembled. After the strap is cut, a tap is made on the wire from terminal 2 and connected to the positive side of the ammeter, and the other side of the ammeter is connected to terminal 1.

### Gray & Davis for Fords

Q—Show wiring of Gray & Davis starter on Ford.—G. S. Van Houghton, Chicago.

There are two systems, one having third-brush regulation and the other having a regulator cut-out. These are shown in Fig. 1.

### Increasing Generator Output

Q—In a model D 1917 Elcar with a two-unit Dyneto electrical system, which has a third-brush regulation, can the output of the generator be increased so as to keep the battery in better condition? The present rate of charge is between 7 and 8 amp.

2—If the brake linings are worn unevenly, would they likely wear the same way if relined?—John E. Schwendeman, Harvey, Ill.

1—Yes, the output of the generator can

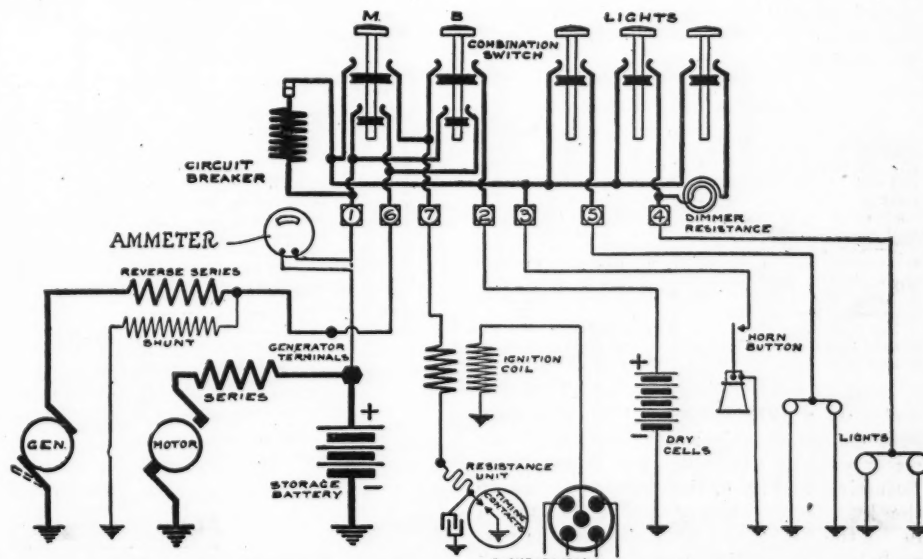


Fig. 2—Wiring diagram of electric system on 1915 Buick with ammeter installed

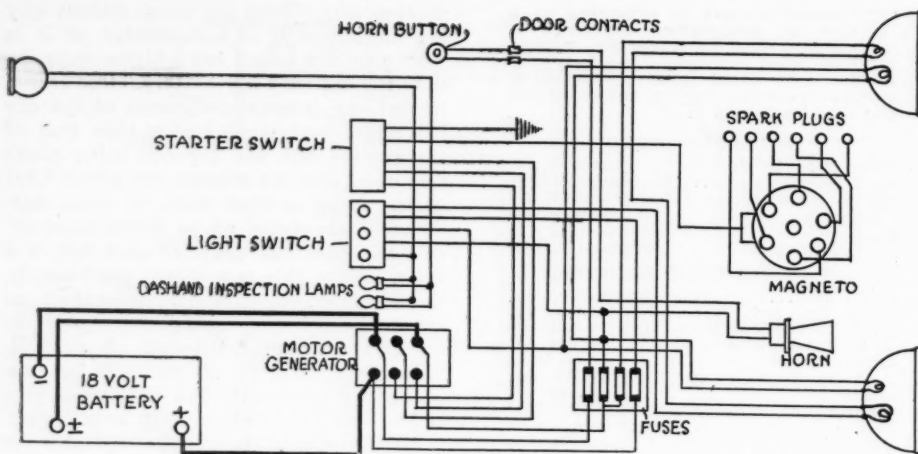


Fig. 3—Wiring diagram of Chalmers 24 Master six

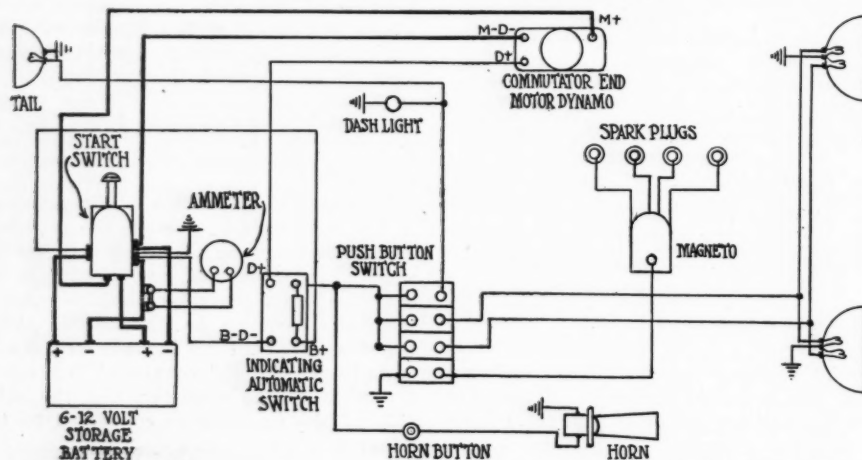


Fig. 4—Method of installing an ammeter on a 1916 Pullman, showing the shunt that is necessary

be increased by changing the position of the third brush. The brushes are held in brass rings which can be seen by removing the housing. The brush in the center is the one to adjust, and by watching the ammeter the proper charging rate can be secured. Seventeen or 18 amp. are necessary for ordinary city driving and slightly less for country driving where the trips are longer.

2—The brake rods are not adjusted right in all probability, for the expansion is not even. The two sides of the brake band should expand or contract evenly, and if this is not so, then the new brake lining also will wear unevenly.

#### Ammeter on Pullman

Q—In your Aug. 1 issue you showed how to install an ammeter on a 1916 Pullman. When the ammeter is connected in the line from the cut-out to the light switch it will not show the charge. Why can it not be connected in the line from the generator to the cut-out so it will show the charge as well as discharge?

2—On an Auto-Lite generator used on the Overland 83 in sending a battery current through the field coils is there any danger of sending the current the wrong way and then reversing the polarity?

3—How can I tell if the windings are reversed and how do I change them back again?—Oliver Sreen, Lake Mills, Iowa.

1—It is very difficult to install an ammeter on a 1916 Pullman, that will show both charge and discharge, because an ammeter with an external shunt is necessary. Referring to Fig. 4, the shunt is shown on the left 6-volt battery and is connected in on the negative terminal. All the currents but the starting currents flow through this wire, and it is therefore perfectly

feasible to install the ammeter shunt there. Then by two small wires one from each end of the shunt to the ammeter, the charge and discharge currents will be registered.

2—Yes, there is always this danger, and great care should be taken to see that the polarity is not reversed.

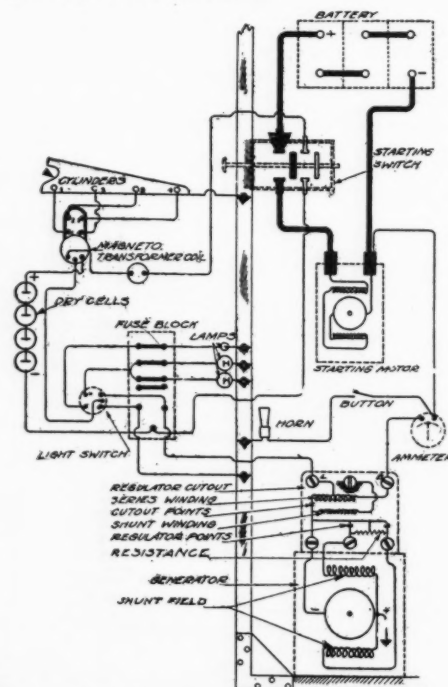


Fig. 5—Wiring diagram of Gray &amp; Davis used on the 1915 Maxwell

3—The negative wire of the generator should be grounded, and if that wire which runs to the ground has not been disturbed and the battery is continually in a discharged condition, then the polarity of the generator has been reversed. To change it back it will be necessary to remove the generator and reverse the connections on the field coils of the generator. This will reverse the polarity.

#### Gray & Davis for Maxwell

Q—Show wiring diagram of Gray & Davis used on 1915 Maxwell.—J. D. Sampson, Thomasville, Ga.

This is shown in Fig. 5.

#### Mitchell Apeldo System

Q—Publish a wiring diagram of 1915 model Mitchell, six cylinders, using the Apeldo starter.—Oscar A. Kichner, Leroy, Ill.

This was published in the Jan. 9, 1919 issue of MOTOR AGE on page 44.

#### Maxwell 25 Diagram

Q—Publish wiring diagram of Atwater Kent on 1916 Maxwell 25, using starting battery for current and regular panel ignition switch.—Morris Ferguson, Salt Lake City, Utah.

This is shown in Fig. 7.

#### Maxwell 1915 Bosch System

Q—Publish wiring diagram of the model 25, 1915, Maxwell, equipped with Bosch high-tension magneto and Simms-Huff starter.—Harry Duncan, Fresno, Cal.

This is shown in the answer to Morris Ferguson of Salt Lake City, Utah, in this issue.

#### Simms-Huff on Maxwell

Q—Will the Simms-Huff motor-generator used on the 1917 Maxwell 25 generate sufficient current to charge a 12-volt battery? The starters on the 1918 models are wired as a straight 12-volt system, while on the 1917 cars they are wired 6 volts for charging and lighting and 12 volts for starting. I am aware that if this generator will generate enough current to charge a 12-volt battery it will be necessary to rewind the shunt winding on the combination cut-out and regulator, as it will be of a too low resistance, the idea being in making this change to get away from the battery, as on the 1917 model, being connected up in series multiple, as when one cell goes bad in one group of the series the remaining two good cells of this group discharge the three good cells of the second series group that are good.—B. M. Sain, Pittsburgh, Pa.

Yes the generator will charge the battery. Adjust the current rate to about 10 amp.

#### Buick and Cadillac Diagrams

Q—Publish wiring diagram of Cadillac 82, model 55, and Buick four-cylinder, 1915, roadster.—C. G. Wallace, Taylor, Ariz.

These diagrams are shown in Figs. 6 and 2.

#### Wiring of Chalmers 24

Q—Publish wiring diagram of Chalmers Master six, model 24, limousine.

2—How far before dead center should a magneto be set?

3—Should it be set by the mark on the fly-wheel, M, with spark retarded?—G. L., Farrell, Pa.

1—The diagram of the model 24 Chalmers is shown in Fig. 3. This is identical with the diagram you desire except for the light in the limousine interior.

2—The setting of the spark of a magneto generally is governed by the conditions that the use of the car will impose. If the car is to be used for high-speed work, it will be necessary to set the spark considerably ahead of dead center. But for ordinary running conditions it is considered rather good practice to set the spark lever



in the center, place the piston on top dead center and adjust the breaker points to fire at this position. The advance and retard control will then take care of the rest.

3—The mark on the flywheel is the most accurate means of setting the engine on dead center.

### Connecting Dry Cells

Q—Show wiring diagram of the North East system on a 1916 Dodge Brothers car. Could dry cells be connected to this system?—August Green, Kramer, N. D.

1—This diagram was shown in the Jan. 30, 1919, issue of MOTOR AGE. Yes, dry cells can be connected into this system, but they cannot furnish the current for starting the engine, and if used for lighting will last only a short while. It is best to use the dry cells for an emergency reserve only.

### Dodge North East System

Q—Illustrate and explain in detail how to adjust the generator output of the North East starting and lighting system on a 1916 Dodge Brothers touring car. The generator charges the battery with an output of 1½ amp. Sometimes when the starter is used the generator will charge the battery with 6 amp. above normal. Why is this? I think the generator output should be about 6 amp.—Arthur M. Mann, Webster City, Iowa.

This system was illustrated in the Jan. 30, 1919, issue of MOTOR AGE. As was stated there, there are two systems, each of which were illustrated. The trouble is probably due to the failure to operate of the reverse current relay or cut-out, in the one case, or the limiting relay in the other case. A loose connection is in all probability the cause.

### Adjustment of Third Brush

Q—The generator on my Mitchell does not generate enough to keep the battery charged. How can I increase output?—George W. Lutes, Cairo, Ill.

This is a third-brush system, and the charging rate is controlled by the position of this brush. Remove the cover plate surrounding the brush end of the generator and with a screwdriver loosen the screw that holds this third brush, the one between the two side brushes. Then shift this brush and watch the ammeter. If the charging rate decreases, the brush is being moved the wrong way. Reverse the direction of motion and adjust to about 18 amp. at an engine speed corresponding to a car speed of 25 m.p.h.

## Engines

### Causes of Lost Power

Q—What causes an Allen model 37 not to have any power? The valves have been ground and new rings put in. It has a Schebler carburetor. The engine runs smooth but has no power. The brakes are free and everything seems to be all right.

2—Publish timing and adjustment of this engine.—Preston Moody, Fort Benton, Mont.

1—Assuming that the conditions necessary for good compression are present, that is, the valves are tight, the piston rings are fitted properly to insure against loss of compression and that there are no score marks on the cylinder walls, then the following things may be the cause for your loss of power: Is the carburetor functioning properly? The mixture may be too rich and a slow burning takes place within the cylinder and consequently there is a loss of power. There may be excessive deposits of carbon within the cylinder, which

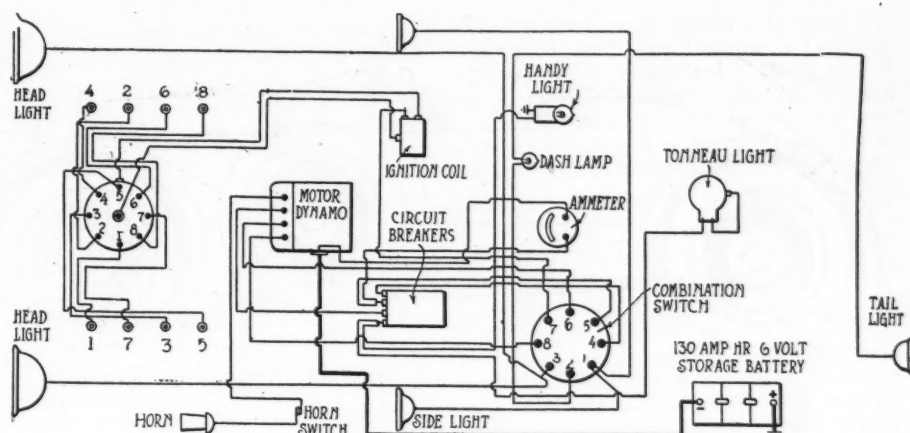


Fig. 6—Wiring diagram of 1917 Cadillac

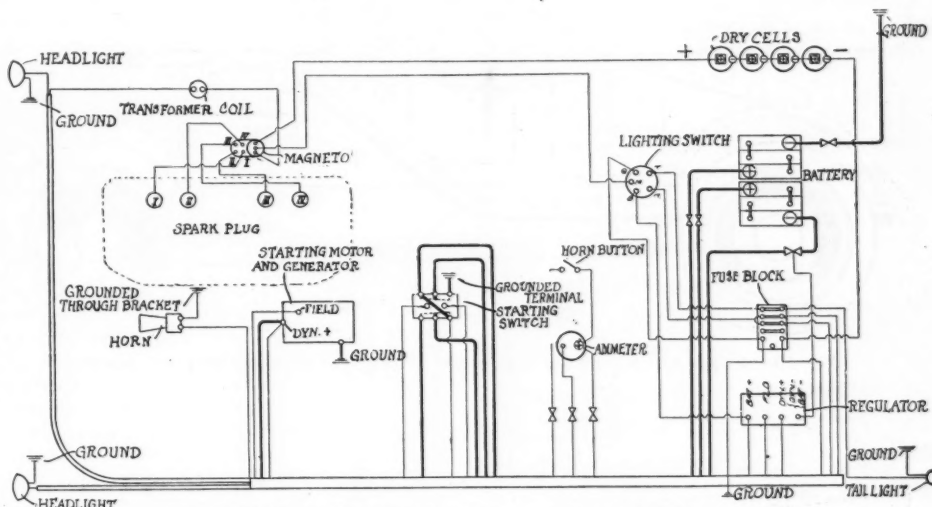


Fig. 7—Wiring diagram of electric system on 1915 Maxwell

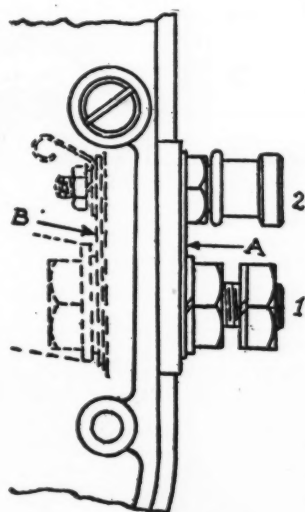


Fig. 8—Generator on Buick, showing connections for installing ammeter

is a means of losing power. Are the spark plug electrodes adjusted so the gap is the thickness of a worn dime? The lubricating oil, if too thin from the leakage of gasoline past the piston, is apt to cause the pistons to seize because of improper lubrication. Carburetion, though, is one of the important difficulties, and this should be looked to first.

2—Adjust the clearances between the valve stem and the tappets to 0.004 in. for the intake valve and 0.005 in. for the ex-

haust. The inlet valve opens 15 deg. before dead center and closes 40 deg. after dead center. The exhaust valve opens 45 deg. before dead center and closes 10 deg. after dead center.

### Spark Plugs Foul

Q—My Oakland 34B, 1918, was purchased May 10, 1918, and by Nov. 10 had been driven 8000 miles. When driven 2400 miles the valves were ground and carbon removed. The oil consumption was 1 qt. for every 75 miles, and it had never misfired. When driven 5000 miles cylinder No. 4 began to miss and the plug was oiled. Up to this time the plugs had only been cleaned once and then did not show much carbon. When the engine was torn down cylinder No. 4 showed a slight score about 3½ in. long and about ½ in. wide and hardly deep enough to be noticeable. New gasoline-tight ring was put on this piston, but no improvement was noticeable. When the car was not driven more than 30 m.p.h. I could go about 150 miles before the plug fouled, but above that speed it would foul up in 2 or 3 miles.

A dull pound in the engine was noticeable at 25 m.p.h. and at all speeds above 15 m.p.h. in climbing hills, and all plugs began to foul with oil. The car would pull good for a short distance at a speed of about 25 or 30 m.p.h., but suddenly would stop then start and stop, etc.; similarly at 45 or 50 m.p.h. on level ground. Upon disassembling the engine there was play in all the connecting rod bearings, but not enough to cause knocking. The rear and center main bearings had at least ¼ in. play. The car is equipped with aluminum pistons with two rings and has a hollow, or drilled, crankshaft oiling system. The gage never showed more than 15 lb. oil pressure. I use a heavy grade of oil. The camshaft had one of the holes for the oil plugged in each bearing. Would the loose bearings cause the plugs to foul?

2—Can iron pistons be put in this engine without reboring the cylinders?

3—The car after 5000 miles used a quart of oil every 45 miles. The gasoline mileage was about 19 m.p.g. Would it be advisable to use three piston rings instead of two?

4—The car had been driven hard and over

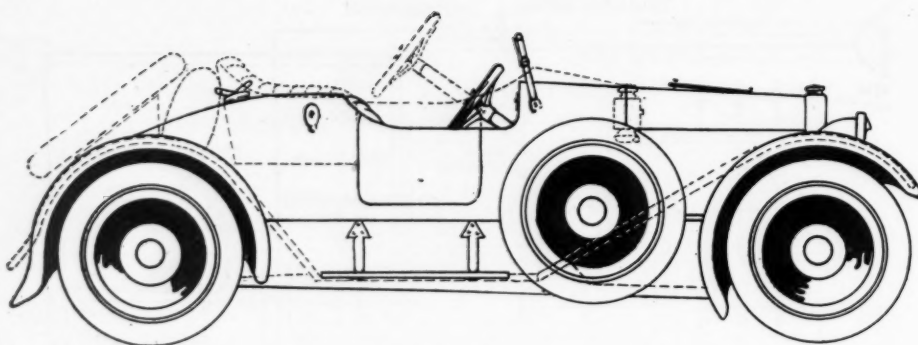


Fig. 9—Suggestion for rebuilding a 1912 Overland car

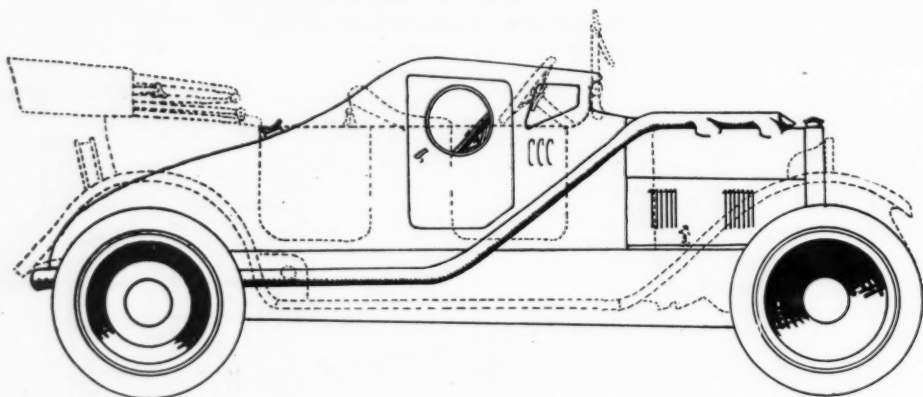


Fig. 10—A type of racing body that might be fitted to a Dodge Brothers chassis

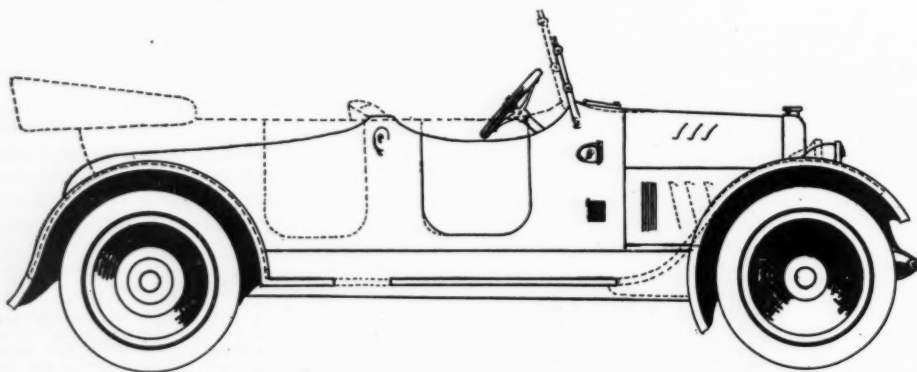


Fig. 11—How an Oakland six might be converted into a racer



Fig. 12—Not built for beauty, but it makes speed, says the rebuilder of this Ford

rough roads, mud, etc. Should this affect the engine?—H. O. Brown, Wheeling, W. Va.

1—The loose bearings would not be a direct cause of the plugs fouling. The fouled plug of No. 4 cylinder is caused by the score mark. No piston ring will have sufficient elasticity to expand and fill the depression caused by the score. A space always will exist between the cylinder wall and the surface of the ring. A gas engine will act as an ideal oil pump if given the opportunity, and score marks present the means. The proper thing to do is to have the cylinders reground, not the one with the score mark but all of them, as an unequal distribution of work is the result of regrinding only one cylinder.

2—Iron pistons can be installed in your engine without reboring, and they no doubt will help to relieve spark plug fouling, because iron pistons can be fitted with closer clearances than aluminum, due to the smaller expansion of iron when heated.

3—Three rings are better than two.

4—Ill-treatment of any machinery reduces its efficiency. When a motor car engine is subjected to hard continuous service it must have more than ordinary care. The loose connecting-rod bearings have been caused by the heavy loads together with the lack of lubrication. The oil pump may have shown 15 lb. pressure constantly, but the oil has been too heavy to flow properly to the bearings.

#### Engine Runs with Jerks

Q—My 1918 Reo will not run smoothly at low speed. When it is throttled below 7 m.p.h. it begins a jerky movement. It is not an irregular jerking, such as is caused by one cylinder having poor compression, but with each stroke of the engine. One mechanic stated that the compression is too great, caused by the combustion chamber being too small and recommended putting a gasket about  $\frac{1}{8}$  in. thick between the cylinder blocks and the crankcase. Would a gasket  $\frac{1}{8}$  in. thick make a noticeable difference in the compression?

2—Would lower compression affect the power, speed or fuel consumption?—H. V. Price, York, Neb.

1—MOTOR AGE does not think that your compression is too much, as this would indicate a fault in design, which is not the case, the Reo engineers having designed the engine with the proper amount of compression to burn the fuel safely. If too much compression were the case, pre-ignition might occur at times, which would make itself manifest by a knocking sound and not a jerk. In our estimation the spark has been retimed recently or else was that way from the beginning, and the spark is advanced too much for idling speeds.

2—A gasket  $\frac{1}{8}$  in. thick would affect the compression, the power would be less. The fuel consumption would decrease slightly only, because the carburetor probably would have to be readjusted for a slightly richer mixture.

#### Backlash in Driveshaft

Q—Publish remedy for backlash in a 1916 Paige Fairfield driveshaft. This is very noticeable going down hill or when the engine misses.

2—Can a driveshaft and rear end complete of this year's make be fitted in place of the old one?—Earl Harrison, Muskegon, Mich.

1—The adjustment for backlash is accomplished by jacking up one rear wheel, then loosening the bolt on the under side of the pinion gear housing and removing the small rectangular coverplate on the top of the pinion gear housing by taking out the two cap screws. Then you will notice that the pinion gear can be moved in or



out by an adjusting screw collar. By turning this adjusting collar the pinion can be moved in or out until the correct running position is obtained. This position is determined by the lack of backlash and the absence of noise. In replacing, see that the lug on the under side of the cap will fit into the recess on the adjusting collar.

2—Yes, with a few changes, which the factory would have to make.

## Rebuilding

### Making Racing Car of Detroit

Q—Publish suggestions for stripping a 1912 Detroit into a racing car.

2—Will aluminum pistons, connecting rods and raising or lowering compression be of any benefit to speed? I have a Detroit stock chassis that has been converted into a racing car equipped with a Bosch magneto and Zenith carburetor. The wheelbase has been shortened 8 in. and the car develops 60 m.p.h.

3—Give instructions to alter same so as to make 75 or 80 m.p.h.

4—Publish mechanical drawing of a high-powered racing car, 1917 model.

5—Publish address of a reliable concern that makes light rods and pistons.

6—Publish suggestions for stripping a Carnation into a racing car.—B. F. Milton, Denton, Tex.

1—The 1912 Detroit is shown in Fig. 14 remodeled as a racing car.

2—Aluminum pistons will give a snappier engine than will iron pistons. Connecting rods of a light and strong pattern also will help the engine slightly to increase its power. The big difficulty with aluminum pistons is that they must have a larger clearance than iron pistons and, consequently, need more, and better fitted and tighter, piston rings. Aluminum pistons conduct the heat away so rapidly that condensation is caused within the cylinder of the fuel, which runs down into the crankcase. If you can raise the compression slightly, it will allow the engine to run at a warmer temperature and thus increase the power.

3—The changes mentioned will help increase the power of the engine, but it is improbable that the engine speed will be affected enough to increase the car speed from 60 to 80 m.p.h. The gear ratio of your car is 4 to 1, and to make 80 m.p.h. would mean that your engine would be going 3200 r.p.m. To reconcile the speed you want to a possible engine speed, the gear ratio will have to be changed to about 2.9 to 1. It would not be advisable to increase the tire sizes, because the center of gravity is affected to a detrimental degree generally when this is done.

4—MOTOR AGE has no mechanical drawings available of racing cars, such being generally locked up in the strong room of the concern designing racing cars.

5—The columns in the advertising section of MOTOR AGE have the addresses of aluminum pistons and light rod manufacturers.

6—Fig. 13 shows a Carnation car changed to a racing car.

### Reader Remodels Ford

Madrid, Neb., Editor MOTOR AGE—Having seen several cuts of Ford racers and in view of fact that information concerning my Ford racer may be of benefit to readers, I am sending description of same. In lowering and shortening the frame I removed the rear spring perch from the original position and placed it in the hub cam hole in the axle housing flange. I sawed the

frame in two near the back in tapering part of frame so that it would fit inside of frame amidship and then shoved the frame together 24 in. Then I took a piece of angle iron  $\frac{1}{4}$  in. thick and flanges measuring  $1\frac{1}{2}$  in. and cut off horizontal flange at the ends and bent the ends so the inside measurement was  $24\frac{1}{4}$  in., just the width of frame, outside measurement, and then bolted same on the front end of the frame, so that I have a bracket for my front spring, using another set of spring clamps.

In setting the front axle ahead 3 in. it was a substitute for setting the engine back, and in view of the fact that the rear axle set at the rear of frame about 4 in., the frame being 76 in. long, the wheelbase is 83 in. and the frame is lowered about 5 in. I also removed two leaves from the rear spring, making it ride easier, as I sit over the rear spring in a single seat made of galvanized iron. In building the engine I rebored the cylinders  $\frac{1}{8}$  in. and fitted a set of light-weight cast-iron pistons, rebored the valve posts  $\frac{1}{8}$  in. on top, and fitted  $\frac{1}{8}$ -in. larger valves, with  $\frac{3}{8}$ -in. stems. I then rebored the posts on the side  $\frac{1}{4}$  in. and put in pieces of old exhaust pipe. I used a special Rayfield manifold with Holley  $1\frac{1}{2}$ -in. carburetor with special fittings on manifold to fit the enlarged post. I removed the magneto from the flywheel and coils and by drilling a hole in the transmission cover fit a  $\frac{3}{8}$ -in. pipe which works on the same principle as Hupp series 71 and model H-32. I use a Bosch DU4 variable for ignition.

The gasoline tank is located on back of dash. An oil tank made from gas stove tank and clamped on with Presto tank clamps is located on the front of the dash and is fitted with petcock at bottom and a piece of copper tubing leading to the front end of the engine. I use 28 by 3-in. wheels and 3 to 1 gear and have done 52 m.p.h. on  $\frac{1}{2}$ -mile dirt track. I use a honey-comb radiator and no fan, and my engine never heats. I have run 20-mile races and my engine oils perfectly.

I built this car myself and made many

of the special parts myself. It costs less than \$500 and has beaten all Fords equipped with sixteen-valve heads that I raced against. My car weighs 940 lbs. and is balanced perfectly, 550 lbs. on each end with my weight. You will note this car is not built for beauty, therefore I give competitors a bigger surprise.—Noel E. Bullock.

### Dodge Brothers Racer

Q—Publish a snappy race body for a Dodge Brothers car.

2—Could a fourth gear be added, making four forwards?—C. W. Harter, Jr., Hobart, Okla.

1—In Fig. 10 is shown a suggestion for a snappy racing body mounted on a Dodge Brothers chassis. Note from this that an oil tank has been placed just back of the seats. The pump draws oil from this tank and forces it to the crankcase. An engine traveling at high sustained speeds requires a great deal of oil for lubrication, and much pumping can be done without danger of flooding the crankcase.

2—Do not attempt to install a fourth gear as this means a lot of work and you do not need it for such a car. If you want to increase the speed, change the gear ratio. Installing a fourth gear cannot be done in many cases and means fitting an entirely new gearset.

### Rebuilding Overland 59

Q—Publish suggestion for rebuilding an Overland 59R.—U. L. Jones, Kelly Field, Tex.

This is shown in Fig. 9.

### Converting Oakland to Speedster.

Q—Publish idea for turning an Oakland six into a speedster.—R. A. Yoost, Clark, S. D.

1—This is shown in Fig. 11.

### Rebuilding Engine for Speed

Q—In rebuilding an engine for high speed and quick acceleration by lightening the rods and replacing 63-oz. pistons with 14-oz. ones, should the flywheel also be reduced in weight? If so, how much?—Roy M. Martin, Keokuk, Iowa.

No. It would not be necessary to reduce the weight of the flywheel if the engine, in its original state of construction was balanced properly throughout.

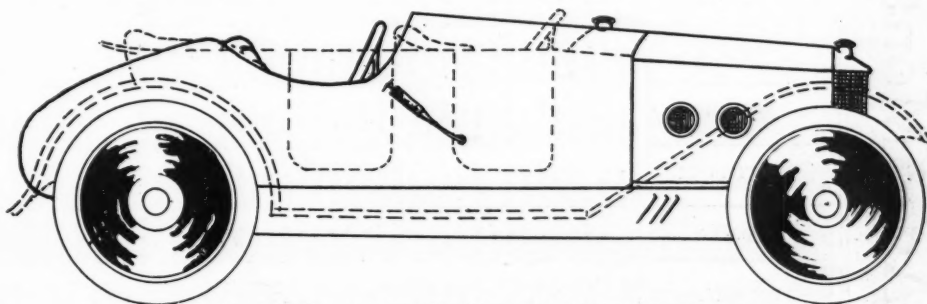


Fig. 13—How a Carnation car may be remodeled for speed

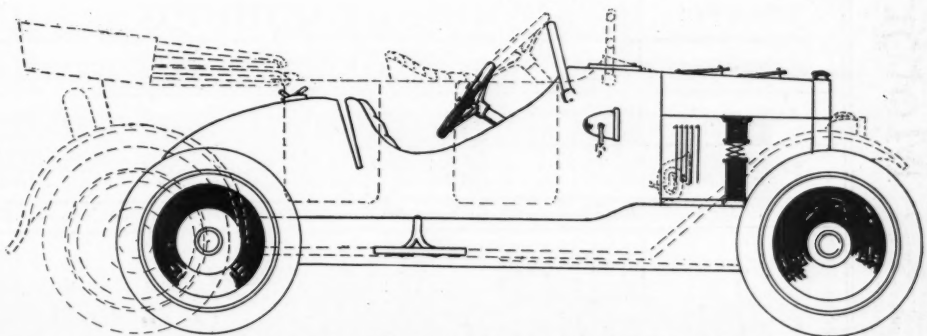


Fig. 14—Suggestion for making racer of a Detroit car

**Steering gear**—Gullin, Gundersen and Berg



Abbreviations: **Engine**—Wauk., Waukesha; **Conf.**, Continental; **H.S.**, Herschell-Spillman; **Lyc.**, Locomotive; **N.A.**, North American; **Herc.**, Hercules; **Mil.**, Milwaukee; **Wis.**, Wisconsin; **Le.R.**, LeRoi; **G.R.S.**, Golden Bellrup & Swartz; **Beav.**, Beaver. **Ignition**—Eise, Eisenmann; **A-K**, Atwater Kent; **Koko**, Kokomo; **Spl.**, Splittdorf; **Conn.**, Connecticut; **Lau.**, Lauraine; **Berl.**, Berlin; **A-L**, Auto-Lite. **Electric Lighting**—Nite, Nitec; **G&D**, Gray & Davis; **Al-Ch.**, Al-Cha-Chalmers; **West.**, Westinghouse; **N.L.**, Neville; **Det.**, Detroit; **N.E.**, North East; **Wag.**, Wagner; **Assterk**, electric starting also. **Governor**—Wauk., Waukesha; **Duplx**, Duplex; **Cont.**, Continental; **Mon.**, Monarch; **Simplex**, Simplex; **McCan.**, McCann; **Rugla**, Rugla; **Chalmers**, Chalmers; **Stromberg**; **Ray**, Rayfield; **King**, King; **Shaw**, Monarch; **Shako**, Shakespear; **Car.**, Carter; **Flech.**, Fletcher; **Holl.**, Holley; **Ensign**, Ensign; **Mast.**, Mast; **Grant-John.**, Grant-John; **Johnson**, Johnson; **Stew.**, Stewart; **Till.**, Tillotson; **Astervik**, vacuum fuel feed. **Brown-Lipe**; **Det.**, Detroit; **H.S.**, Herschell-Shaw; **Mech.**, Mechanics; **M&E**, Merchant & Evans; **Lyc.**, Locomotive. **Geasert**—B-Lipe, Brown-Lipe; **G-Lees**, Grant-Lee; **Cover**, Cover; **Savage Arms**, Savage Arms; **Final Drive**, in internal gear; **st-dng**, double reduction; **s-bay**, spiral bevel; **ext-g**, external gear. **Axle**—Timken, Timken; **Torben**, Torben; **Torbenson**, Key-H. Keystone-Hendley; **Shel.**, Sheldon. **Tires**—Asterk, pneumatic. **Steering Gear**—Gem., Gemm.; **Larz.**, Larve; **Warn.**, Warner; **Ditw.**, Dittweiler; **Jack.**, Jacob; **Post.**, Foster; **Wol.**, Wolhrab. **Tires**—Asterk, pneumatic. **W-W**, Walker-Weiss; **Emp.**, Empire.

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Make of Engine	No. Cyl., Bore and Stroke	Ignition	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
Macacar, L	1 1/2	2,750 3964	36x5	36x5	Cont.	4-4 1/2x5 1/2	Bosch	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Macacar, H	2 1/2	3,300 3843	36x4d	36x4d	Cont.	4-4 1/2x5 1/2	Bosch	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Macacar, U	3 1/2	4,100 3865	36x5d	36x5d	Cont.	4-4 1/2x5 1/2	Bosch	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Macacar, M	5 1/2	5,000 3865	40x6d	40x6d	W.B.	4-4 1/2x5 1/2	Bosch	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mac, AB	1	2,400 3664	36x3 1/4	36x3 1/4	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AB	1 1/2	2,800 3664	36x3 1/4	36x3 1/4	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AB	1 1/2	2,800 3664	36x3 1/4	36x3 1/4	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AB	2	3,000 3664	36x4d	36x4d	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AB	2 1/2	3,000 3664	36x4d	36x4d	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AC	3 1/2	4,600 3665	36x4d	36x4d	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AC	5 1/2	5,200 3665	40x6d	40x6d	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AC	7 1/2	5,500 3667	40x7d	40x7d	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AC	11	5,500 3667	40x7d	40x7d	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Mac, AC	15	5,500 3667	40x7d	40x7d	Own	4-4 x5	Split, opt.	Own	opt.	B-Lipe	B-Lipe	chain	Timkn.	Ross
Manly, 30	14	2,550 3664	36x5	36x5	Wauk.	4-4 1/2x5 1/2	Eise.	Wauk.	Zenith*	Own	Own	chain	Timkn.	Russel
Manly, 40	22	2,550 3664	36x6	36x6	Wauk.	4-4 1/2x5 1/2	Eise.	Wauk.	Zenith*	Own	Own	chain	Timkn.	Russel
Master, M	2 1/2	2,390 3444	36x4	36x4	Buda	4-4 1/2x5 1/2	Eise.	McCann, Mast.	Fuler	Fuler	Fuler	in-g.	Timkn.	Russel
Master, M	2 1/2	2,390 3444	36x4	36x4	Buda	4-4 1/2x5 1/2	Eise.	McCann, Mast.	Fuler	Fuler	Fuler	in-g.	Timkn.	Russel
Master, W.L.	2 1/2	2,390 3444	36x4	36x4	Buda	4-4 1/2x5 1/2	Eise.	McCann, Mast.	Fuler	Fuler	Fuler	in-g.	Timkn.	Russel
Master, W.L.	2 1/2	2,390 3444	36x4	36x4	Buda	4-4 1/2x5 1/2	Eise.	McCann, Mast.	Fuler	Fuler	Fuler	in-g.	Timkn.	Russel
Master, A.	3 1/2	2,600 3665	40x6d	40x6d	Buda	4-4 1/2x5 1/2	Eise.	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Maxwell	1	1,195 364*	34x4	34x4	Own	4-3 1/2x5	Delco	Delco*	John.	Own	Own	worm	Timkn.	Ross
McMenomine, H	1	1,025 3253	32x4	32x4	Own	4-3 1/2x5	A-K.	A-L.	Pierce	Own	Own	worm	Timkn.	Ross
McMenomine, D	1 1/2	1,890 3643	34x5	34x5	Cont.	4-3 1/2x5	Eise.	Pierce	Pierce	Own	Own	worm	Timkn.	Ross
McMenomine, D	2 1/2	2,475 3663	36x4d	36x4d	Cont.	4-3 1/2x5	Eise.	Pierce	Pierce	Own	Own	worm	Timkn.	Ross
McMenomine, D	3 1/2	2,550 3663	36x4d	36x4d	Cont.	4-3 1/2x5	Eise.	Pierce	Pierce	Own	Own	worm	Timkn.	Ross
McMenomine, J	5	3,850 3663	40x6d	40x6d	Cont.	4-3 1/2x5	Eise.	Pierce	Pierce	Own	Own	worm	Timkn.	Ross
Modern, 30	1	1,600 3433	34x5	34x5	Cont.	4-3 1/2x5	Eise.	opt.	Zenith	Own	Own	worm	Timkn.	Ross
Moreland, 17 N	1 1/2	1,775 3633	34x5	34x5	Cont.	4-3 1/2x5	Dixie	opt.	Miller	Own	Own	worm	Timkn.	Ross
Moreland, 17 B	1 1/2	2,630 3633	36x5	36x5	Cont.	4-3 1/2x5	Dixie	opt.	Miller	Own	Own	worm	Timkn.	Ross
Moreland, 17 C	1 1/2	2,630 3633	36x5	36x5	Cont.	4-3 1/2x5	Dixie	opt.	Miller	Own</				

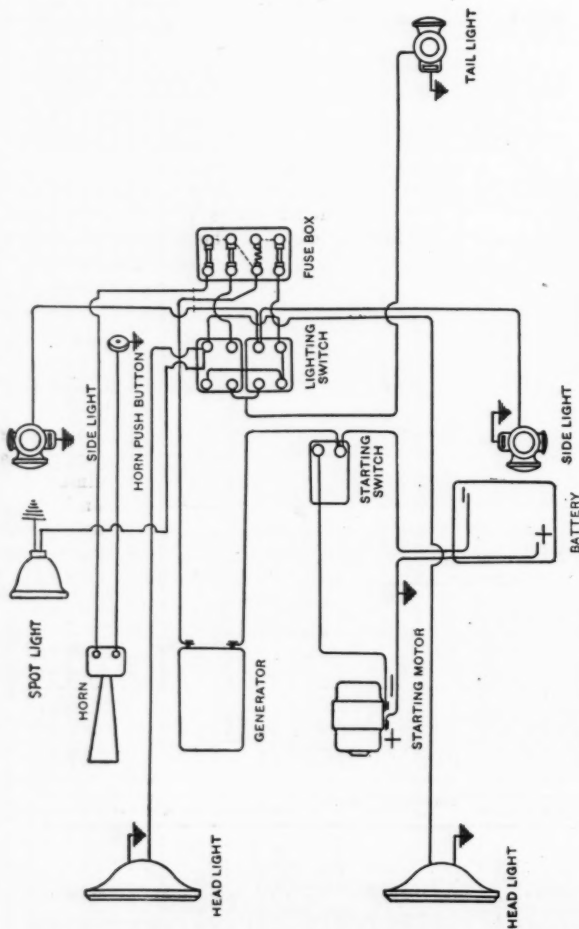
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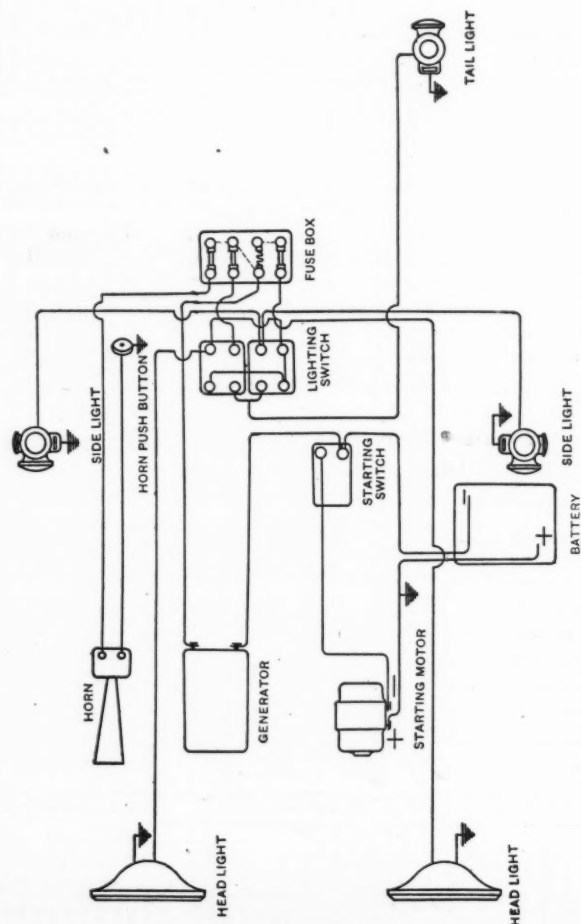
Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Name of Engine	No. Cyl. Bore and Stroke	Ignition	Electric Lighting	Governor	Clutch	Gearset	Final Drive	Axle	Steering Gear
O. K., 3T.	11	2,250 30x4	30x5	30x5	Buda	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
O. K., 1T.	11	2,985 30x4	30x5	30x5	Buda	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Old Hickory, M.	11	2,950 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Old Rel'ble, W-15	11	2,350 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Old Rel'ble, W-25	21	2,350 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Old Rel'ble, W-35	21	2,350 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Old Rel'ble, W-50	5	5,000 30x6	30x6	30x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Old Rel'ble, C-50	5	5,000 30x6	30x6	30x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Old Rel'ble, C-70	7	2,000 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Oneida, A.	1	2,600 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Oneida, B.	1	2,600 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Oneida, C.	1	3,700 30x6	30x6	30x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Oneida, D.	31	3,700 30x6	30x6	30x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Oneida, E.	5	4,750 30x6	30x6	30x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Overland, Panel.	5	800 31x4	31x4	31x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Overland, Exp.	5	1,015 32x4	32x4	32x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	1	2,650 34x3	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	1	3,000 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	2	3,400 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	3	4,100 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	3	4,100 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	4	4,450 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	5	5,100 36x6	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Packard, E.	5	5,400 36x6	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Palmer.	1	1,855 34x3	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Panhard, A.	1	2,275 36x3	36x4	36x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Panhard, B.	1	1,195 32x3	32x3	32x3	Gray	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Panhard, C.	1	1,395 32x3	32x3	32x3	Gray	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Parker.	3	3,700 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Parker.	3	3,700 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Parker.	3	4,250 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Parker.	4	4,250 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Parker.	5	5,000 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Patriot.	1	2,150 34x3	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Peerless, TC.	3	4,125 36x4	36x4	36x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Peerless, TC.	3	4,150 36x4	36x4	36x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Peerless, TC.	5	4,700 36x6	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Peerless, TC.	5	4,700 36x6	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Pierce-Ar., R-9.	2	3,750 30x4	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Pierce-Ar., R-9.	2	5,500 36x6	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Power.	2	36x4	36x4	36x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rainier, R-5.	1	1,250 33x4	33x4	33x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rainier, R-5.	1	1,550 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rainier, R-4.	1	1,550 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rainier, R-6.	1	1,890 34x3	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rainier, R-6.	2	2,895 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Ren-Leslie, B.	8	2,895 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Reo, F.	1	1,250 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Republic, Desp.	1	1,095 32x3	32x3	32x3	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Republic, 10 Sp.	1	1,485 34x3	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Republic, 11X.	1	1,775 34x3	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Republic, 12X-A.	1	2,150 34x4	34x5	34x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Republic, TX.	3	3,450 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Riker, B.	3	30x5	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Riker, BB.	3	30x5	30x5	30x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rose, CDW.	2	3,000 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rose, CDW.	2	3,250 34x4	34x4	34x4	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rose, CDW.	3	3,900 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Rose, FW.	3	4,900 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Royal.	1	2,800 34x4	34x5	34x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Royal.	1	2,800 34x4	34x5	34x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Royal.	2	3,500 36x4	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Royal.	2	3,500 36x4	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Royal.	3	5,000 36x5	36x5	36x5	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Royal.	5	5,000 36x6	36x6	36x6	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross
Royal.	7	6,500 36x7	36x7	36x7	Wau.	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	worm	Chgo.	Ross

Abbreviations: Engine—Wau., Waukesha; Cont., Continental; H-S, Herschell-Spillman; Lyc., Locomotive; N.A., North American; Herc., Hercules; Mil., Milwaukee; Wia., Wisconsin; LeR., LeRoi; CBS, Golden, Belknap & Swartz; Bay., Bayview; Ignition—Eise., Eiseemann; A-K, Atwater Kent; Koko., Kokomo; Split., Splitdorf; Conn., Connecticut; Lau., Lauraine; Berl., Berlin; A-L, Auto-Lite; Electric Lighting—Nite, Nitec; G&D, Gray & Davis; A-L, Auto-Lite; Dyneto, Dyneto; Al-Ch, Alis-Chalmers; West., Westinghouse; L-N, Leese; Neville, Nevil; Det., Detroit; N-B, North Bend; Wag., Wagner; Asterisk, electric starting also. Governor—Wau., Waukesha; Duplx., Duplex; Cont., Continental; Mon., Monarch; Simp., Simplex; McCann, McCann; Ruggles, Ruggles; Schob., Schobler; Strom., Stromberg; Ray., Rayfield; King, Kingston; Mon., Monarch; Shake, Shakespear; Car., Carter; Flech., Fletcher; Holl., Holley; Ensign, Ensign; Mast., Mast; John, Johnson; Det., Detroit; Mech., Mechanics; Cover, Cover; Saye, Saye; Salsbury, Salsbury; Ind., Industrial; Chgo., Chicago-Standard; Chgo., Chicago; W-W, Walker-Weiss; Emp., Empire; Brown-Lipe; Del., Detroit; H-S, Herschell-Spillman; M&E, Merchant & Evans; Lyc., Locomotive; Key-H, Keystone-Hindley; Shel., Sheldon; Salisb., Salisbury; Ind., Industrial; Chgo., Chicago-Standard; Chgo., Chicago; W-W, Walker-Weiss; Emp., Empire; 4-drt., double reduction; s-bev., spiral bevel; ext-g., external gear; Axle—Timken, Timken; Torben, Torben; Warner, Warner; Wob., Woburn; Tires—Asterisk, pneumatic.

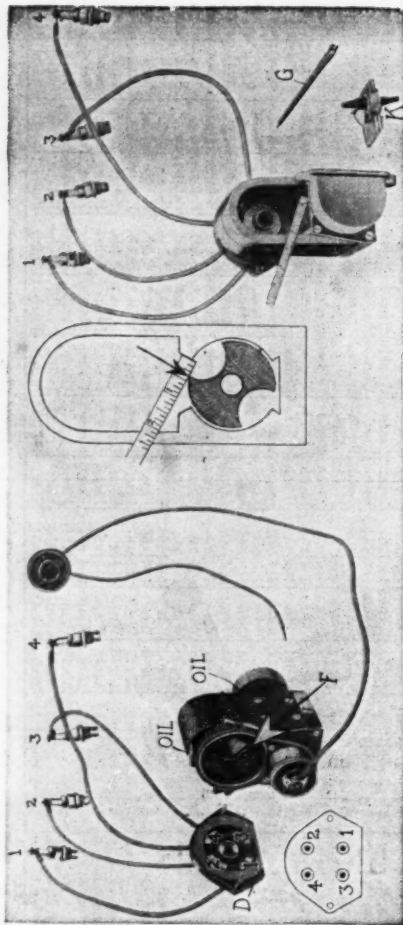
# Motor Age Wiring Diagram Chart No. 15



1915 Hupmobile, showing manner of attaching a spotlight

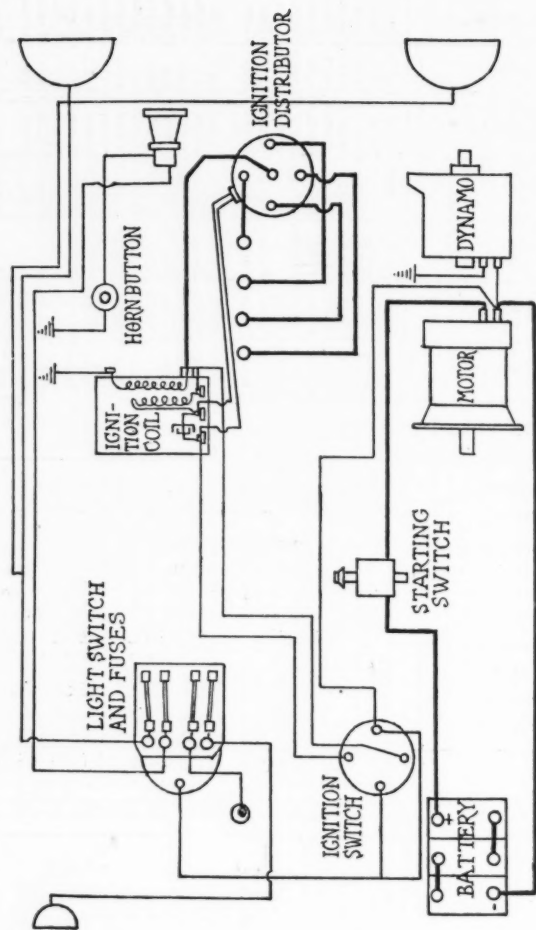


1915 Hupmobile, showing connections between the various units



Points to be observed in timing 1912 Hupmobile. A rule is used for setting the armature properly

Alter—Nov. 14	Hudson—Dec. 5	Oakland—Jan. 2
Buick—Nov. 21	Krit—Feb. 6	Oldsmobile—Jan. 23
Cadillac—Dec. 19	Locomobile—Jan. 23	Overland—Nov. 7-14
Chevrolet—Nov. 28	Marmon—Dec. 9	Regal—Feb. 6
Cole—Jan. 23	Maxwell—Dec. 16	Scripps-Booth—Dec. 26
Dodge Brothers—Dec. 12	Mercer—Jan. 23	Studebaker—Dec. 26
Ford—Jan. 30	Mitchell—Jan. 9	



Hupmobile in which the ignition is separate



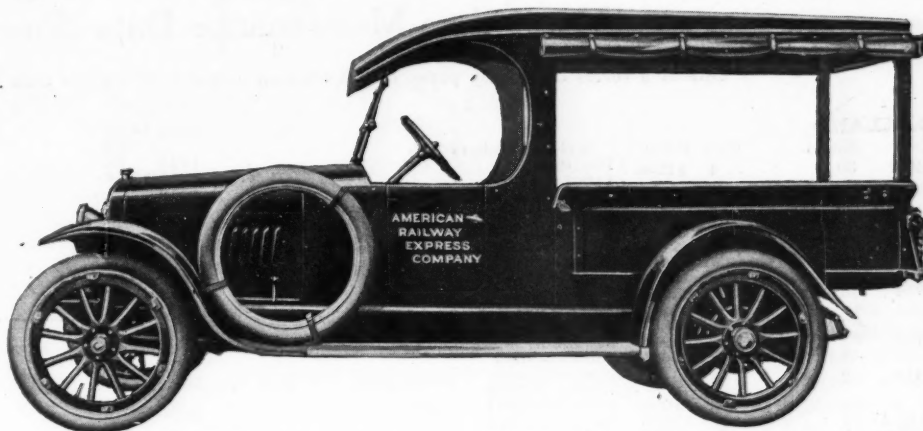
# Maibohm Brings Out 1/2-Ton Business Car

Can Be Used for Passenger Service as Well

THE Maibohm Motors Co., Racine, Wis., has brought out a six-cylinder business car with a capacity of 1/2 ton to sell at \$1,290. It uses a 3 1/2 by 4 1/4 Falls engine. Lubrication is by a combination pump to the bearings and splash to the cylinder. Cooling is thermosyphon with a Perflex radiator. A Stromberg carburetor is used, and fuel is fed by the Stewart vacuum system. Ignition is Atwater Kent, and starting and lighting is by a Wagner 6-volt two-unit system with Bendix drive starter and generator. A Willard battery is used. The clutch is Borg & Beck, and the transmission is Mechanics. Hotchkiss drive is employed.

## Brake Equipment

The brakes are internal and external on 12-in. rear wheel drums 2 in. in diameter. Steering gear is Jacox. The front axle is a drop-forged I-beam section, and the rear axle is full floating with Brown-Lipe-



Maibohm 1/2-ton business car which will sell at \$1,290

Chapin differential. The high gear ratio is 4.5 to 1; second, 7.875 to 1; and low, 13.68 to 1. The springs are semi-elliptic, 36 in. in front and 49 in the rear. Artillery-type wheels with Stanweld rims and 32 by 3 1/2 tires are used.

The wheelbase is 116 in. and the road clearance at the lowest point 10 1/2 in. The loading space is 6 ft. long. The body is

built in the Maibohm factory of seasoned ash and maple, well braced and steel reinforced throughout. The roof is natural wood finish covered with weather-proof duck. Extra seats, cross or lengthwise, may be provided for passenger purposes. Wire screens for side and rear or solid side panels and full rear doors are furnished on special order.

## Getting Prospects for Lighting Plants

### Listing Future Buyers

A LIVE list of prospects is of the utmost importance to the farm light-plant dealer. It and the demonstration plant go hand in hand. One is practically useless without the other. For this reason the compilation of a prospect list cannot be undertaken too early in the history of the business. The problem is how to go about it.

In the first place, not every man who lives on a farm is an immediate prospect for a lighting plant. Maybe he never will be one. Therefore, it is up to the dealer to use some discrimination when he is making up his list. This is particularly important where the dealer is just starting in the business, otherwise he will lose a lot of time and waste a lot of energy working on men who either cannot or will not buy immediately.

### Method of State Distributer

A state distributor who has had an extensive and successful experience in starting and instructing dealers uses the following method: He first lists every farmer in the trade territory who owns his farm. From this list he eliminates all those who rent their farms to others. From the remainder he drops all those temporarily who are notoriously hard up or who are considered to be indifferent farmers and those known to be exceedingly hard nuts to crack. An average taken from many dealer territories proves that after the elimination of these undesirables about 60 per cent of the farm owners are left as likely prospects. This leaves an abundant crop of prospects in any dealer's territory, be it large or small in area.

When the list has been winnowed to this

extent the dealer is instructed to call upon every one of the farmers included in the 60 per cent. It very rarely happens that the dealer who does so fails to sell at least 10 per cent of his prospects within the first six months of his campaign. If the sales made are located in the territory strategically and if they have been made to progressive and influential farmers, as usually is the case, so many centers have been created from which to work.

To some it may seem that six months in which to sell 10 per cent of the likely prospects in a territory is a long time for rather meager results. It must not be forgotten, however, that this is but an average record. Some dealers will do better than that, others worse—much depending upon the sales ability of the individual dealer and upon the punch he puts into his campaign. It does not seem to matter much what sort of a territory the dealer may have, for the average persists over a wide expanse of country. So the degree of success attained seems to depend primarily upon the dealer himself.

Suppose there are 200 farmers in the dealer's trade territory. This is very much below the average number, but take 200 for an example. The elimination referred to reduces this number by 40 per cent, or eighty, leaving 60 per cent, or 120 likely prospects. If he does not exceed the average, the dealer will have sold 10 per cent of these, or twelve farmers, inside the first six months. This means two plants a month, and, as the usual farm-lighting installation will run better than \$500 a plant, he will have had a business of at least \$6,000 for the period covered, which is very

good for a man starting in a new business.

Another equally experienced distributor instructs his dealers to prune out their prospect list much in the same manner, but he goes about working the list differently. He makes a point of the strategically located, influential farmer. His plan is about as follows: He works radially out from his town as a center. He selects in each territory a man who is influential and to whom other farmers are accustomed to look for guidance. The whole selling energy of the dealer then is concentrated upon these few de luxe prospects with the idea that if they can be sold it then will be easy to sell neighboring farmers who are able to buy.

### Plan Has Worked

This plan as yet is more or less theoretical and has not been worked out to such an extent that it is possible to draw average conclusions. However, in many localities it has worked out admirably, and it is probable that where it can be put across at all the trade results of the first few months may be in excess of those secured through the other method.

But, whatever method is followed, in the last analysis the method of developing business from a prospect list will depend upon the dealer and his interpretation of the conditions which exist in his territory. Whatever the method of development, the main thing is to have a list to work upon. Proper discrimination in the selection of prospects makes it certain that time and energy will not be wasted on men unresponsive or impossible, and this is of the first consideration to the dealer when he is establishing a business of farm lighting plants.

# Serial Numbers of Passenger Cars

## Motor Age Maintenance Data Sheet No. 25

One of a series of weekly pages of information valuable to service man and dealer—Save this page

### OAKLAND

Year	Model	Cyls	Price	Serial Numbers
1912	30	4	\$1200	7001-8000
	40	4	1450	11001-11500
	45	4	2100	8001-9000
1913	35	4	1075	9650-11000
	42	4	1600	9001-9600
	60	6	2400	35001-37500
1914	36	4	1200	40001-43601
	48	6	1785	60001-60951
	62	6	2500	360000-364000
1915	37	4	1200	480000-481150
	49	6	1685	620000-620100
1916	32	6	795	370000-373599
	38	4	1050	490000-49050
1916-17	50	8	1585	320000-328000
1917	34	6	875	330000-347100
1918	34-B	6	....	380000-384001
				500000-502000
				134-3000034
				3000134 up

### OLDSMOBILE

Year	Model	Cyls	Price	Serial Numbers
1912	26	4	\$3000	
	40	4	3500	71100-80324
	60	6	5000	
1913	53	6	3200	80325-81500
1914	54	6	2975	83000-84399
1915	42	4	1285	
	55	6	2975	84500-92999
1916	43	4	1095	
	44	8	1195	93000-118782
1917	43	4	1095	
	45	8	1295	119000-200000
1918	45	8	\$1467	Number on plate under front seat
	Pacemaker	8	1700	125500-142999
	37	6	1185	146000-148899
	37	6	1185	150000 up
	37	6	1185	193000-200000
	37	6	1695	190000-190999
	37	6	1595	192000-192799

### OVERLAND

Year	Model	Cyls	Price	Serial Numbers
1912	58	4	\$850	1 251
	59	4	900	1 13257
	60	4	1200	1 3003
	61	4	1500	1 2309
1913	69	4	985	1 30026
	71	4	1475	1 2965
1914	69	4	950	1 45006
	K-16 W-Kn'ht	4	2850	1 40
1915	81	4	850	1 20406
	80	4	1075	1 20005
	82	6	1475	1 2583
1916	K-19 W-Kn'ht	4	2475	41 248
	75	4	615	1 33850
	83	4	695	1 102409
	86	6	1145	1 12000
1917	84 W-Knight	4	1125	1 13049
	75-B	4	635	33851 65694
	85-4	4	795	1 42339
	85-6	6	925	1 15304
	88-4 W-Kn'ht	4	1285	1 9679
	88-8 W-Kn'ht	8	1950	1 1602
	88-6 W-Kn'ht	6	1325	1 4944

As with but two exceptions the serial numbers start anew in each year it is necessary to consider the model in connection with its identification number

### PACKARD

Year	Model	Cyls	Price	Serial Numbers
1912	18	4	\$3200	
	30	4	4200	20001-27000
	Six	6	5000	
1913	38	6	4150	35026-37999
	48	6	4850	38000-66000
1914	2-38	6	3350	
	48	6	4850	75026-78386
1915	5-48	6	4850	
	3-38	6	3750	8000-26-90000
1916	1-25	12	2750	
	1-35	12	3150	125051-150000
	2-25	12	....	
	2-35	12	....	
1917	2-25	12	3050	150051-175000
	2-35	12	3500	
1918	3-25	12	3700	
	3-35	12	4100	
1918	3-25	12	3950	150000 up
	3-35	12	4300	

### PAIGE

Year	Model	Cyls	Price	Serial Numbers
1911-12	25	4	\$900	2000-4499
1912-13	25	4	975	4500-6999
1913	25	4	975	7000-9170
1913-14	36	4	1275	10001-13999
1914	25	4	975	9171-9999

1914-15	36	4	1075	14000-20000
	46	6	1395	55000-59999
1915	36	6	1095	80000-84999
1915-16	46	6	1295	60000-66000
1916	38	6	1090	85000-89923
	46	6	1375	65600-69999
1917	39	6	1330	89924 up
	51	6	1495	70000-74999
	55	6	1775	75000 up
1918	51	6	....	75001-79150
	59	6	....	102001-112000

### PATERSON

Year	Model	Cyls	Price	Serial Numbers
1912	G	4	\$1600	4001-4425
	H	4	1850	
1913	45	4	....	6001-6350
	47	4	1850	8001-8052
1914	33	4	1200	9300-9700
	32	4	1200	9010-9059
1915	6-48	6	1400	1000-1101
	4-32	4	1200	X100-X573
1916	6-42	6	995	301-1302
1917	6-45	6	....	5001-6986
1918	6-46	6	....	8501 up
	6-46-R	6	....	

### PATHFINDER

Year	Model	Cyls	Price	Serial Numbers
1912	12	4	\$1750	500-802
1913	13	4	2185	1000-1342
1914	14	4	2185	
	14	6	2750	1500-1716
1915	..	..	2222	
	..	..	2750	2002-2566
1916	Six	6	1695	
	Twelve	12	2475	2901-4175
1917	3-B	12	2750	8001-17525
				Number on dash plate

### PEERLESS

Year	Model	Cyls	Price	Serial Numbers
1912	33	4	\$4300	12001-12900
	35	6	4000	121001-121296
	36	6	5000	122001-122439
	37	6	6000	123001-123088
1913	35	6	4300	131001-131251
	36	6	5000	132001-132386
	37	6	6000	120368-123123
1914	36	6	5000	142001-142589
	37	6	6000	143001-143058
1915	36	6	5000	152001-152100
	54	4	2000	DD101-DD2500
	55	6	2250	EE101-EE5000
1916	56	8	1890	160001-169000*
1917	56	8	1890	170001-179000
1918	56	8	2340	230001 up

\*To March 21

### PIERCE-ARROW

Year	Model	Cyls	Price	Serial Numbers
1912	36 H. P.	6	\$4000	32200-33200
	48 H. P.	6	5000	9199-9201-57
	66 H. P.	6	6000	9259-9321, 9323-9522
				9524-42, 9544-9667, 9669-9684, 9686-9769, 9771-10000, 10002-8, 10010, 10012-19, 10021-26, 10028-35, 10037-58, 10060-1, 10064-5, 10077-8, 10083, 10088, 10095-10105, 10122, 10126-7, 66298-66500
1913	38-C	6	4300	33301-34050
	48-B	6	5000	10301-11125
	48-D	6	5000	9543, 9668, 9685, 9770, 10001, 10009, 10011, 10059, 10062-3, 10066-78, 10079-82, 10084-87, 10089-94, 10106-9, 10111-12, 10115-16, 10118-19, 10121, 10123-25, 10128-32, 10137, 10139-40, 10159, 10165, 10187-8, 10197-8, 9200, 9258, 9322, 9523, 10020, 10027, 10036, 10110, 10113-4, 10117, 10120, 10133-6, 10138, 10141-9, 10150-3, 10154-8, 10160-4, 10166-86, 10189-96, 10199, 10200
	66-A1	6	6000	66601-66800
1914	38-C2	6	4300	34101-34603 and 34047
	48-B2	6	5000	11201-12100 and 11100
	66-A2	6	6000	66900-66964
1915	38-C3	6	4300	34701-36450
	48-B3	6	5000	12301-13050
	6-A3	6	6000	67050-67150
1916	38-C3	6	4300	34451-36350
	48-B3	6	5000	13051-13650
	66-A3	6	6000	67050-67150
	38-C4	6	4300	36601-37800
	48-B4	6	5000	13901-14900
	66-A4	6	6000	67201-67400
1917	38-C4	6	4300	37701-38700
	48-B4	6	5000	15001-16000
	66-A4	6	6000	67499-67800
1918	48-B4	6	5000	16001-16400
	48-B5	6	6500	16401



# Service Equipment

## Time Savers of the Shop

### Cylinder Reboring Machines

SEVERAL new features have been incorporated in the line of machines put out by the Storm Mfg. Co., Thompson, Iowa, during the last season. Among them are a six-cutter head construction with patented improved lower bearings, modified guide rest and feed bushing. These cylinder reboring machines come in several types. The present capacity of the machines is from 2½ to 5 in., with special large equipment up to 6 in. The company also makes a machine for Fords, and a special machine for Fords and Dodge Brothers cars. These also are of the six-cutter construction but differ in details from the standard machine.

### Oily Waste Cans

Automatic oily waste and non-explosive safety cans are put out by the Justrite Mfg. Co., 2061-81 Southport avenue, Chicago, for using and storing explosive or inflammable oils in garages and other places. All the cans are approved, tested and inspected by the Underwriters Laboratories, Inc., under the direction of the National Board of Fire Underwriters. Two models are offered, the Justrite and the Security. The Justrite nozzle is in one piece, of a heavy bronze casting with two spouts, one for pouring and the other for filling. The safety device consists of a valve seat bored into the bronze. The plunger, or valve stem, has a specially prepared soft metal point which insures a uniform air-tight seat, preventing leakage and evaporation. If gas is generated by excessive heat, the valve releases and allows it to escape. The filling spout has an automatic cover which is closed tightly, except when held open by the funnel while filling. An automatic air vent is operated in conjunction with the lever, allowing the liquid to pour freely. The body is of No. 24 gage heavily coated leaded plate, double seamed and finished in baked red enamel. The safety feature of the Security consists of a spout cap controlled by a strong non-rusting bronze spring inside, which holds the cap closed tight, preventing leakage and evaporation. The cans are operated by pulling a lever inside the handle with a natural hand grip. The valves close automatically when the lever is released.

### Klemme Hoist

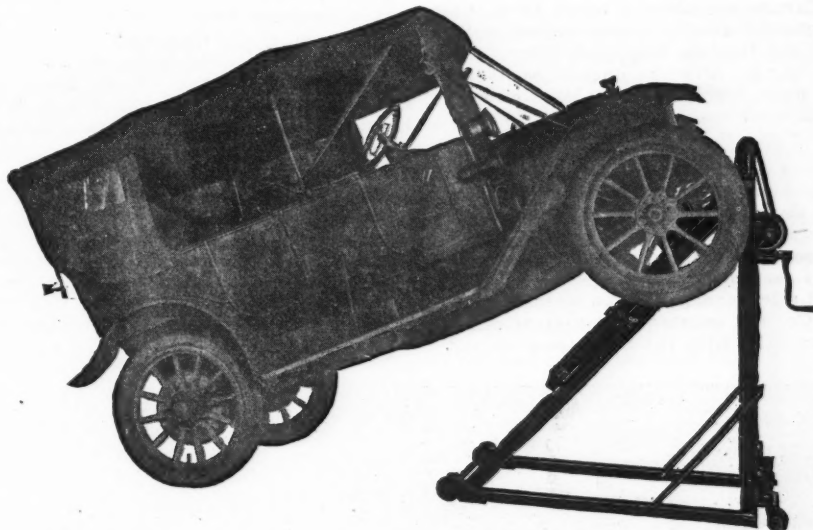
The hoist and crane made by the A. C. Klemme Mfg. Co., Davenport, Iowa, for use in garages is a one-man device, that is, one man can raise a car on end, front or rear to any height the job requires, with it. The hoist lifts from underneath the axle, and a safety device locks the car at the height desired. To lock it a stop pin is inserted in a hole provided for it in the web of the standards. The device is tested to withstand a strain of 13,000 lb. With

the crane attachment the hoist stands 8 ft. 1 in. high; without it, 6 ft. 10 in. The lifting height of the hoist is from 48 to 53 in. It is made from 3-in. I-beams and sells for \$200.

### Portable Tank Outfit

The Black & Decker Mfg. Co., Baltimore, Md., has brought out a new Lectroflator outfit consisting of a ½-hp. air compressor with a capacity of 2 cu. ft. of air a minute, with a cylindrical pressed steel reservoir 14 by 30 in. mounted on three wheels and provided with a handle so the whole can be wheeled about as necessary. The reservoir holds enough air at one filling to inflate five average tires from flat to full

pressure or ten tires from 40 to 60 lb. The outfit comes complete with switch, electric cable, attachment plug, pressure gage, safety valve, 25 ft. of hose, tire connector and all piping and wiring, ready to run as soon as unboxed. The compressor unit itself is the standard No. 2. The motor develops a full ½ hp. and operates at will on alternating current of 60 cycles or less and direct current. The compactness of the unit is obtained by inclosing the motor, gear train and compressor in one housing. The motor and compressor are cooled by forced circulation of air through the common housing and can be run continuously without overheating, it is said. Current consumption is about 0.1 cent a tire, it is claimed. The outfit lists at \$195.



Klemme motor car hoist and crane for use in garages



The new Electroflator is shown at the right, while at the left is the Van Sicklen new speedometer and watch combination described in last week's issue

# Among the Makers and Dealers

## Short Trade Notes

**BLOCKER Manages Republic Advertising**—Honor Blocker, who has been assistant for the last two years, has been appointed advertising manager of the Republic Rubber Co., Youngstown, Ohio.

**Taylor Has Large Signal Territory**—The R. E. Taylor Corp., New York, has been made distributor for the Signal Motor Truck Co., Detroit, in territory comprising New York City and state, western Connecticut, New Jersey, Pennsylvania, Delaware, Maryland and District of Columbia.

**Payne Company Extends Territory**—The Payne Motor Co., Des Moines, Iowa, has closed a contract to distribute Paige cars and trucks for the entire state of Minnesota and the western half of Wisconsin in addition to the Iowa territory already held. The Wisconsin and Minnesota business will be handled from Minneapolis, where the company has taken over a five-story building.

**Newberry Joins Hession Tractor**—J. B. Newberry, formerly assistant superintendent of the Curtiss Aeroplane & Motor Corp., has been appointed general superintendent of the plant of the Hession Tractor & Tiller Corp., Buffalo, N. Y. Previous to coming to the Curtiss plant four years ago Mr. Newberry was connected with the Franklin at Syracuse, N. Y.

**Firestone Products Adds to Force**—The Firestone Steel Products Co. has added three men to its sales force. A. D. Droeger, as manufacturers' representative, will travel throughout the country. C. W. Flick will cover the eastern territory. He was formerly assistant sales manager of the Mason Tire & Rubber Co. and assistant manager of pneumatic tire sales with the B. F. Goodrich Co.

J. C. Bailey has been made western representative. He comes from the Mason Tire & Rubber Co.

**Liebold Still Secretary to Ford**—E. G. Liebold, secretary to Henry Ford for many years, will continue in that capacity and hereafter will be located at the Dearborn plant, where he also will become a supervisor at the tractor plant.

**Saxon for Fifty-nine Counties**—The Laster Motor Co., Des Moines, Iowa, has secured a territory of fifty-five counties in Iowa and four counties in Missouri for the Saxon car. This is one of the largest contracts secured by a Des Moines dealer in several years.

**Torbenson Axle to Extend Plant**—The Torbenson Axle Co., Cleveland, Ohio, contemplates a \$75,000 plant extension and has contracted for the immediate construction of a two-story brick, steel and mill constructed building 100 by 140 ft. as an addition to its present plant.

**Scheu Is King Sales Manager**—E. A. Scheu, formerly eastern district manager of the New York branch of the King Motor Car Co., has been promoted to be sales manager with headquarters in Detroit. R. M. Mann, who was in charge of the Brooklyn branch of the King, has been made assistant sales manager of the home office.

**Distributor Markets Accessory Line**—L. F. Schoelkopf, head of the L. F. Schoelkopf Co., Madison, Wis., distributor of the Ford in Dane county, has created a manufacturing and jobbing department in accessories and supplies which is marketing a broad line of goods under the brand of Shelko. The business has grown in a short time to such size as to employ two traveling men on full time.

G. L. Litt manages the department with five assistants.

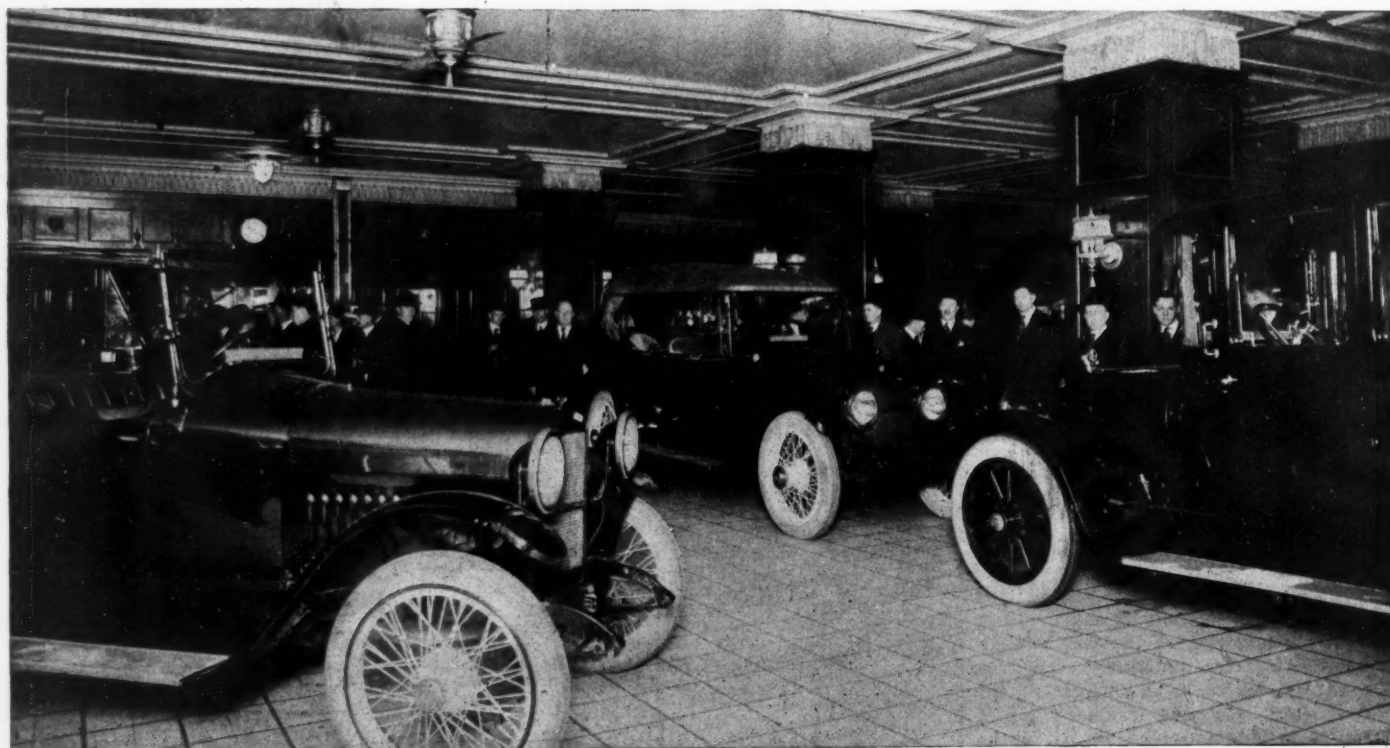
**George Is Barley A. S. M.**—J. R. George, formerly connected with the F. S. Carr Co., Boston, makers of automobile fabrics, has become assistant sales manager of the Barley Motor Car Co., Kalamazoo, Mich.

**Radeys Is Haynes Advertising Manager**—Gilbert U. Radeys, in the past associated with the Hudson Motor Car Co. and Packard Motor Car Co., Detroit, and with Nordyke & Marmon, Indianapolis, Ind., has been appointed advertising manager and assistant sales manager of the Haynes Automobile Co., Kokomo, Ind.

**Klopper with National Tire**—V. L. Klopper has been appointed chief engineer of the automotive department of the National Tool & Mfg. Co., St. Louis, Mo. He was formerly designing engineer for the Dorris Motor Car Corp., St. Louis.

**Goodrich Promotes George Wurtz**—George Wurtz, for several years general Wisconsin traveling representative of the mechanical goods department of the Diamond division of the B. F. Goodrich Co., Akron, Ohio, has been promoted to the post of eastern manager of the same department, with headquarters in Pittsburgh, Pa.

**Changes in Acme Truck Personnel**—The Acme Motor Truck Co. has made the following additions and changes in its organization: H. L. Browne has joined the sales force and will act as factory representative in Colorado, Wyoming, New Mexico and Utah. He formerly was with the Service Motor Car Co. J. E. Bowles, for the last year special representative in the Mid West, will be transferred to the Pacific Coast, with headquar-



**WHEN DALLAS DEALERS STAGED SHOW**—Twenty-two dealers got together in Dallas last month and staged the first mid-winter show in one of the hotels there. This was a closed car affair



ters at San Francisco. George P. Gould will act as factory representative in Maine, Massachusetts, New Hampshire and Vermont.

**Worked Forty Years for E.-B.**—Phillip R. Wood, Rockford, Ill., for forty years in the employ of the Emerson-Brantingham Co., most of the time as superintendent of construction, is dead. He was seventy-five years old.

**Schooler Heads Des Moines Trade**—The Des Moines Automobile Dealers' Association held its annual meeting recently and elected the following officers: President, Dean Schooler; vice-president, W. W. Sears; treasurer, C. L. Herring; secretary, C. G. Van Vliet.

**Greer Heads F.-W.-D. Service**—E. R. Greer, at one time engineer of the Emerson-Brantingham Co. tractor plant at Minneapolis, and more recently the personal representative of Maj. F. Glover of the Motor Transport Corps, has been placed at the head of the service department of the Four Wheel Drive Auto Co., Clintonville, Wis.

**Nolan Is Roamer Eastern Representative**—John F. Nolan, for several years Buffalo district representative for the Maxwell Motor Sales Corp., is now eastern representative of the Roamer motor car. He is handling the sales for all territory east of Detroit and has his headquarters in Buffalo, N. Y. For the last year he was in the U. S. service as an aviator stationed at Love Field.

**Morgan Is Cleveland Tractor Engineer**—Maj. M. B. Morgan has been appointed chief engineer of the Cleveland Tractor Co., Cleveland, Ohio. June, 1917, he went into National service as assistant to the chief of the Ordnance Department at Washington. In that capacity Major Morgan was in charge of the designing and development of the caterpillar tanks and tractors used for war purposes.

**Wagoner Heads Indianapolis Trade**—A. B. Wagoner of the Marmon Sales Co. was elected president of the Indianapolis Automobile Trade Association, Indianapolis, Ind., at the recent annual meeting. The other officers elected in 1919 are: N. H. Cartinhour, Cartinhour-Bowman Co., vice-president; Andrew Hutchinson, Detroit Electric Sales Co., secretary, and H. C. Lathrop, Lathrop-McFarlan Co., treasurer.

**Hart-Parr President Dies**—Adelbert E. Ellis, president of the Hart-Parr Co., Charles City, Iowa, died Jan. 12. Mr. Ellis was born in Rome, N. Y., in 1848. Since 1878 he has been one of the leading lawyers in this section of Iowa. It was through the efforts of Mr. Ellis and his brother that the Hart-Parr Co. was located in Charles City in 1901. Since then Mr. Ellis has been one of the most active members of the board of directors of the company.

**Nash Entertains Japanese Commission**—Charles W. Nash and the Nash Motors Co., Kenosha, Wis., recently entertained the commission of Japanese army officials who are making a tour of military manufacturing centers of the United States in behalf of the government of Japan. Mr. Nash tendered the visitors a luncheon, following which the big Nash plant was inspected. The mission then watched a demonstration of the efficiency of the Nash Quad.

**Milwaukee Tire Dealers Organize**—Tire and supply dealers of Milwaukee have organized an association for mutual benefit and to eliminate trade abuses of various kinds, notably promiscuous discounting. The new body is known as the Tire Dealers' Association of Milwaukee and officers have been elected as follows: President, Russell L. Stephens, manager Republic Tire Co.; first vice-president, George A. Brown, Brown's Tire Shop; second vice-president, Henry F. Stenzel, president

and manager Milwaukee Tire & Supply Co.; secretary, H. A. Packard, Standard Racine Rubber Co.; treasurer, Lawrence J. Engel, Milwaukee Tire & Rubber Co.

**Coe with the Motor Car Service**—Capt. Oscar J. Coe, U. S. A., has been appointed sales and service manager for the Motor Car Service Co., Chicago. Captain Coe has just been released from active duty overseas.

**Two New Vice-Presidents for Republic**—Harvey J. Woodard and Mark W. Roe have been advanced to the position of vice-presidents of the Republic Rubber Corp., Youngstown, Ohio. Mr. Woodard becomes vice-president in charge of sales and Mr. Roe vice-president in charge of the plant.

**Sutton Now with Industrial Engineer**—F. W. Sutton, formerly production manager of the Continental Motors Corp. and later general superintendent of the Dayton-Wright Airplane Co., is now the chief engineer of the Charles E. Bedaux Co., industrial engineer, with headquarters in Cleveland, Ohio.

**Chicago Branch for S. & S.**—The Starkweather-Snook Corp., Fort Madison, Iowa, maker of S. & S. shock absorbers, has opened a branch office and warehouse in Chicago with Charles Snook in charge. This concern manufactures shock absorbers for over sixteen different makes of motor cars, and while the main office and factory will continue at Fort Madison, Iowa, the Chicago branch will carry a complete stock at all times.

**Truck Body Concern Leases Plant**—The Great Western Truck Body Co., recently organized for the manufacture of truck bodies and other accessories at Omaha, Neb., has leased the four largest buildings of the Iler distillery, closed by the advent of prohibition, and it is planned to have a force of seventy-five men at work in the plant by the first of March. Officers of the new company are: W. G. Shipley, president; Charles Dundy, secretary; C. O'Brien, manager.

**Gerlinger New Foundry at Work**—The Gerlinger Electric Steel Casting Co., Milwaukee, Wis., has placed in operation its new electric steel foundry, the first heat having been taken Dec. 31. The new plant adjoins that of the Gerlinger Steel Castings Co. It is 84 by 190 ft., with a capacity of 4 tons in 2½ hr. The investment is about \$35,000. The old foundry contains a 3-ton electric furnace and will be continued in operation. The Gerlinger companies are under identical ownership and management and specialize in automotive castings.

**Texas Dealer Community Schools**—Community schools with the idea of teaching the mechanism and operation of tractors have been inaugurated by several dealers throughout Texas. The chief purpose of the schools is to interest the farmers in modern methods and appliances of agriculture. They also will enable men who own tractors to care for their machines without the aid of service stations. There are approximately 3500 tractors in use in Texas. In arranging for tractor service schools, districts containing the largest percentage of machines have been chosen by the various companies to receive the course of lectures.

**Highway Trailer Reviews Year**—The Highway Trailer Co., Edgerton, Wis., at its annual stockholders' meeting, reported unfilled orders in excess of \$105,000, while its 1918 business amounted to more than \$500,000, consisting largely of Government contracts for special military trailers. The balance sheet showed assets of \$222,000, including enlargements and improvements costing \$25,000 made during the last year. The company declared a 7 per cent dividend on a capital of \$179,000, payable Feb. 1. President James W. Menhall and other officers and directors were re-elected. One of the notable jobs now going

through the factory is a 15-ton trailer of special design for the Manitowoc Shipbuilding Co., Manitowoc, Wis., a Government shipyard. It is believed that this is the largest trailer ever constructed.

**Advertising Manager Dies at Desk**—George Burkle, advertising manager of Gray & Davis, Inc., died of heart failure at his desk on Jan. 31.

**Hodgkins Is Cleveland Officer**—R. T. Hodgkins, general sales manager of the Cleveland Tractor Co., was elected a director of that company at a recent meeting of the stockholders and at the directors' meeting following he was chosen vice-president.

**Goodrich Moves Up Diers**—C. L. Diers, formerly in charge of the Indianapolis branch of the Goodrich Tire & Rubber Co., Akron, Ohio, is the new manager in charge of the European division, covering Europe, Asiatic Russia and northern coast of Africa.

**Goodyear Promotes Williams**—C. H. Williams, formerly manager of the Chicago branch of the Goodyear Tire & Rubber Co., Akron, Ohio, has been appointed manager of the far eastern division which covers the Philippines, China, Japan, Java, Siam, India and eastern Russia.

**Bay Back with Hyatt**—Lieut. D. W. Bay has returned to his former position as sales engineer of the Hyatt Roller Bearing Co., Detroit. He served fifteen months with the Quartermaster corps. His territory includes Illinois, Wisconsin and the Northwest. His offices are in Chicago.

**Amazon Rubber Has Great Year**—The Amazon Rubber Co. saw an increase in business during 1918 of 85 per cent over 1917. The company anticipates that the business for 1919 will show an increase of 50 per cent over 1918. An extra dividend of 12½ per cent was issued. Officers for the coming year are: President, Albert Kroehle; vice-president, J. A. Burger; treasurer and general manager, L. J. Schott; secretary and general superintendent, L. F. Smith.

**Changes in Pennsylvania Rubber**—At a special meeting of the board of directors of the Pennsylvania Rubber Co., George W. Daum was elected second vice-president in charge of production and A. H. Price was elected second vice-president in charge of sales. James Q. Goudie, formerly sales director in charge of the middle west district, who represented the company in Washington regarding its Government business, was elected general sales director, in charge of branch sales, with headquarters at Detroit.

**To Make Houdaille Shock Absorber**—The Houde Engineering Corp. has been incorporated in Buffalo, N. Y., with a capital of \$100,000. The corporation has already begun the manufacture of Houdaille shock absorbers. The corporation has bought the American manufacturing rights of this shock absorber, which has been produced in France for the last nine years. Later the firm plans to extend its manufacturing to car and possibly airplane engines. Albert B. Schultz of Buffalo will be president and Frank B. Gibson secretary-treasurer.

**Nelson Truck Incorporates**—The Nelson Motor Truck Co., maker of the Jumbo truck, has incorporated, changing the status of the company from a co-partnership to an incorporation. The capitalization is boosted from \$200,000 to \$500,000. The officers of the company are: President and general manager, H. B. Nelson; vice-president, J. J. Nelson; secretary and treasurer, C. J. Nelson. The company is making a truck a day but anticipates producing 1200 machines this year. A new factory addition is under construction and plans for building a complete new plant are being considered for next year.

# From the Four Winds

## Glimpses at the World of Motordom

**TRACTORS** Plow 17,000 Scottish Acres—More than 17,000 acres of land have been plowed, 2500 acres cultivated, 5000 acres grubbed and 4300 acres harrowed in Scotland as a result of the use of farm tractors during the last season, according to a commerce report.

**Shades of Stage Hold-Up Days!**—Thefts of merchandise from motor trucks in certain localities have become so seriously persistent that some of the long-distance hauling companies and the private installations of the larger textile plants are operating their trucks under heavily armed guard. The com-

mercial cars of the Derry Silk Co. and of Follmer, Clogg & Co. are running between Lancaster, Pa., and New York with two men, besides the driver, armed. It is reported attempts have been made even to hold up some of these trucks.

**Texas Gasoline Situation**—Practically all gasoline and oil station owners in Dallas are continuing the practice of closing at 8 o'clock in the evenings and remaining closed on Sundays. However, some of the smaller concerns are keeping open on Sunday. Gasoline is selling in Dallas for 25½ cents a gallon. The advance of half a cent on the gallon was

made only recently. It has been rumored that the price of gasoline would be reduced soon, but local representatives of the larger oil concerns do not concur in this belief.

**Salvaged Scrap Saves \$3,000,000**—An indication of the completeness of the conservation methods of the Goodyear Tire & Rubber Co. may be gained from the fact that the by-products during the year salvaged scrap and waste material to the amount of \$3,000,000.

**Motorize New Zealand Postoffice**—The post and telegraph department of New Zealand has been allowed \$48,665 for motor cars, motorcycles and bicycles for the use of that department. The department of mines has been allowed \$65,698 to develop the mineral-oil industry of the country.

**Kentucky Road Work for Soldiers**—According to estimates made to the Department of Agriculture, Kentucky will be able to give employment to 4326 discharged soldiers and sailors on the state's road construction and repair work during the coming year. The list includes places for 826 skilled and 3500 unskilled laborers. Rodman Wiley, Kentucky road commissioner, has been asked to report on the number of masons, carpenters, quarry foremen, concrete finishers, roller men and road superintendents that will be required. There is no separate classification for the unskilled labor.

**Good Roads in Quebec**—The development of good roads in Quebec is a subject at present much discussed from one end of the province to the other. In the five years from 1911 to 1916, the Quebec government spent \$15,774,369 for good roads. The following figures show the number of miles of roads systematically maintained by the municipalities of Quebec, with the aid of subsidies from the government of the province: In 1907, 1000 miles; in 1909, 2000; in 1911, 8500; in 1913, 15,000; in 1916, 18,000. Since 1911 more than 1214 miles of macadam and 497 miles of gravel roads have been made in Quebec.

**Collecting Texas Highway Tax**—Tax collectors of Texas are collecting the state highway tax on motor vehicles for 1919. The tax is 35 cents a horsepower. It is estimated at least 200,000 cars will be registered, which will give the highway commission approximately \$1,600,000 for good roads. This money is to be distributed by the commission to the various counties as applications are filed and will be used expressly for the building of good highways across the state. After Feb. 1 all owners of cars not registered are to be arrested and tried in courts. Where fines are paid the money also will go to the state road fund.

**Registration Bill Drawn by Club**—A new registration bill presented to the Nebraska legislature by the Omaha Automobile Club provides that when ownership of a motor vehicle is transferred buyer and seller must both sign a joint statement on the reverse side of the original registration certificate. It further provides that the seller may keep the license plate and seals ten days after application for transfer, and that until the transferee shall have signed the re-assignment certificate the transfer shall be deemed incomplete and not valid or effective for any purpose. This means that the original owner of the car will not sign away his ownership until he is sure a re-assignment certificate will be granted.

## Coming Motor Events

### SHOWS

San Francisco.....	Motor Car Dealers' Association.....	Feb. 6-15
New York.....	Automobile Dealers' Association, trucks.....	Feb. 10-15
Albany, N. Y.....	Automobile Dealers' Association.....	Feb. 15-22
Cleveland, Ohio.....	Automobile Trades Association.....	Feb. 15-22
Rochester, N. Y.....	Automobile Dealers' Association.....	Feb. 15-22
Louisville, Ky.....	Auto Dealers' Association, automotive.....	Feb. 17-22
Newark, N. J.....	N. J. Auto Exhibition Co.....	Feb. 15-22
Minneapolis, Minn.....	Northwestern Automotive Exposition.....	Feb. 15-22
Des Moines, Iowa.....	Automobile Dealers' Association, automotive.....	Feb. 17-22
Grand Rapids, Mich.....	Automobile Business Association.....	Feb. 17-22
South Bethlehem, Pa.....	Lehigh Valley Auto Shows Co., cars.....	Feb. 17-24
St. Louis, Mo.....	Manufacturers' and Dealers' Association.....	Feb. 17-22
Seattle, Wash.....	Motor Car Dealers' Association, cars.....	Feb. 17-22
Wichita, Kan.....	Wichita Tractor and Thresher Club.....	Feb. 18-22
Hartford, Conn.....	Automobile Dealers' Association.....	Feb. 22-March 1
South Bethlehem, Pa.....	Lehigh Valley Auto Shows Co., trucks.....	Feb. 24-27
Springfield, Mass.....	Cars and trucks.....	Feb. 24-March 1
Kansas City, Mo.....	Motor Dealers' Association, cars.....	Feb. 24-March 1
Kansas City, Mo.....	Kansas City Tractor Club, tractors.....	Feb. 24-March 1
Portland, Ore.....	Dealers' Motor Car Association.....	Feb. 24-March 1
Cedar Rapids, Iowa.....	.....	Feb. 24-March 1
Burlington, Iowa.....	.....	Feb. 24-March 1
Duluth, Minn.....	.....	Feb. 25-March 1
Madison, Wis.....	Association of Commerce.....	Feb. 26-March 1
Quincy, Ill.....	Automobile Trades Association, cars.....	Feb. 26-March 1
Detroit.....	Automobile Dealers' Association.....	March 1-8
Quincy, Ill.....	Automobile Trades Association, trucks and tractors.....	March 3-4
Columbus, Ohio.....	Automobile Show Co.....	March 3-8
Buffalo, N. Y.....	Automobile Dealers' Association.....	March 3-8
Little Rock, Ark.....	Automobile Dealers' Association.....	March 5-8
Omaha, Neb.....	Automobile Trade Association, automotive.....	March 10-15
Syracuse, N. Y.....	Automobile Dealers' Association.....	March 10-15
Salt Lake City, Utah.....	Salt Lake Auto Show.....	March 10-15
Peoria, Ill.....	.....	March 12-15
Boston, Mass.....	Automobile Dealers' Association, cars.....	March 15-22
Harrisburg, Pa.....	Motor Dealers' Association.....	March 15-22
Peoria, Ill.....	.....	March 17-18
St. Joseph, Mo.....	Automobile Show Association.....	March 19-22
Brooklyn, N. Y.....	Motor Vehicle Dealers' Association, cars.....	March 22-29
Trenton, N. J.....	Auto Trade Association.....	March 22-29
Pittsburgh, Pa.....	Automobile Dealers' Association.....	March 22-29
Brooklyn, N. Y.....	Motor Vehicle Dealers' Association, trucks.....	April 1-5

### SHOW DATES INDEFINITE

Bridgeport, Conn.....	City Battalion.....	Not Decided
Indianapolis, Ind.....	Automobile Trade Association.....	Not Decided
Philadelphia, Pa.....	Automobile Trade Association.....	March
Philadelphia, Pa.....	Motor Truck Association.....	March
Utica, N. Y.....	Motor Dealers' Association.....	March

### MEETINGS

New York.....	American Road Builders' Association.....	Feb. 25-28
Hot Springs, Va.....	Automotive Equipment Association.....	June 2-6

### RACES

Unlontown, Pa.....	.....	May 17
Indianapolis, Ind.....	500-Mile Sweepstakes.....	May 31